FOOD MANUFACTURE

incorporating Food Industries Manual

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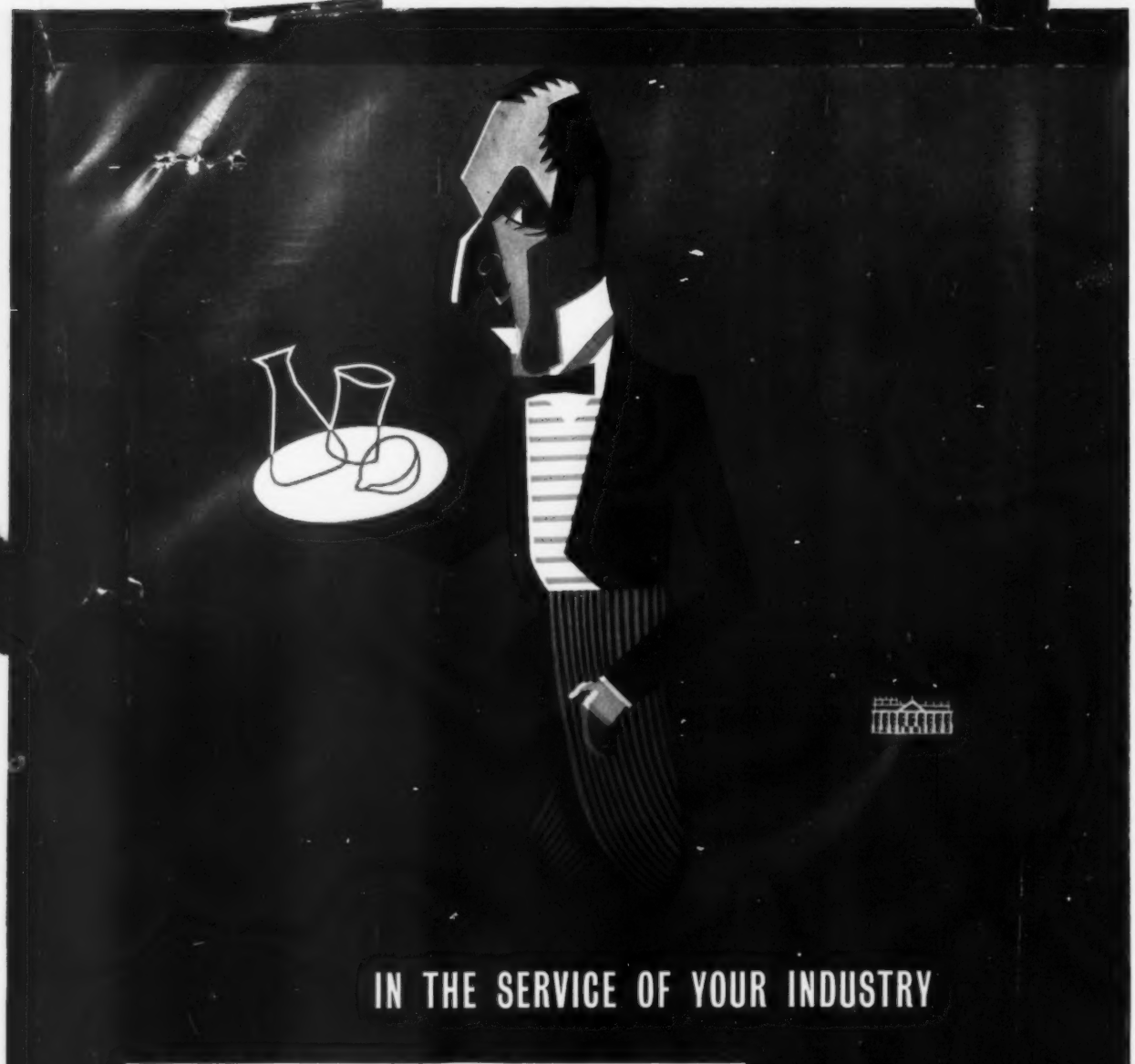

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Regd.

"It's all works and no space!"

said the Works Manager

He didn't look good at all. All the marks of a long spell of strain. "For months I've been doing the impossible", he bawled, as we threaded our way through the factory. "And because I did it last time they think I can do it again. Not a square inch of floor space, and now *I'm told to find room for a test bench . . ." We stopped him before he exploded. Gently we told him his worries were at an end. We were from Yale. We'd been called in by the management to plan a new scheme for materials handling.*

"Materials handling? . . . that's what I told them six months ago! Clear at least three aisles and we could stack to the end bay northlight . . . Well, well.

Here, let me show you the annexe . . ."

He moved like a different man. He had ideas. We had ideas. Together we plotted a scheme that gave him just what he wanted. And, not surprisingly, we pleased the management too—when they saw the turn their costs would take.

IS LACK OF SPACE RESTRICTING YOUR OUTPUT?

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"WORKSAVER"

is specially suitable for smaller plants

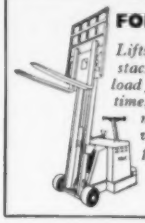
AMONG the wide range of Yale handling equipment the "Worksaver" series of electric trucks is of special interest to factories where restricted space or low-load floors have previously made mechanical handling impractical. Its small size, light weight and extreme ruggedness give big-truck advantages with small-truck economy and convenience.

It will lift, move and stack raw materials or finished products. It saves time, space and manpower. You can ride it or walk it. And it will start cutting costs from the minute you put it to work.

The "Worksaver" is available in five basic types: pallet, low-lift platform, high-lift platform, fork-lift and tractor.

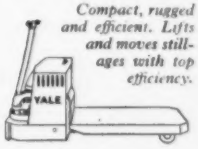
PALLET *Built to stand up to rugged jobs. Lifts and moves maximum load pallets with ease and accuracy.*

FORK LIFT



Lifts, moves and stacks over low-load floors: saves time, space and manpower wherever it's put to work.

PLATFORM



Compact, rugged and efficient. Lifts and moves still-ages with top efficiency.

TRACTOR

A powerful and manœuvrable tractor unit to pull trailers or trailer trains with up to 700 lbs. drawbar pull.

YOU GET ALL THESE ADVANTAGES WITH THE "WORKSAVER"

- *Manœuvrable in small spaces and narrow aisles.*
- *Light weight with great strength and power permit heavy duty work on low-load floors.*
- *Dead man control cuts power and applies brakes automatically in emergency.*
- *Simple fingertip controls—unskilled staff can move, lift and stack with speed and safety.*
- *Low initial cost, low running cost, economical maintenance, long life.*

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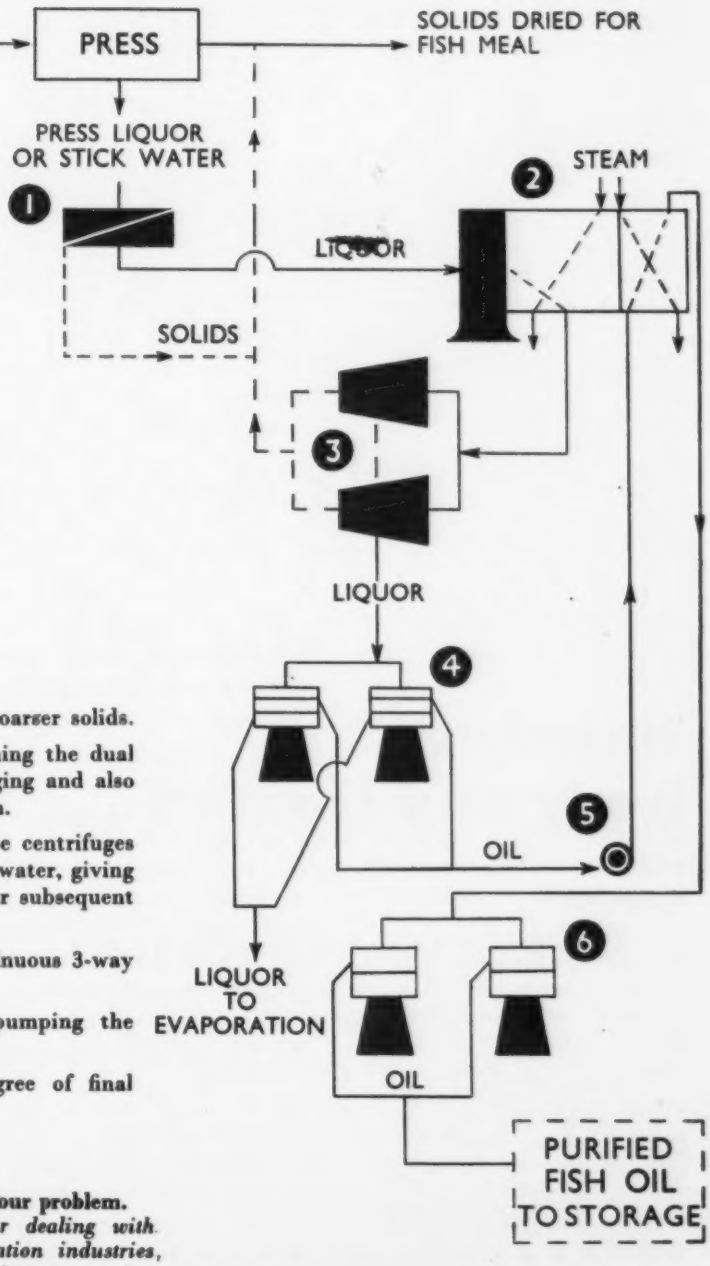

The production of Fish Oil and Meal by the reduction of oily fish is an industry of increasing importance. After cooking the fish, the mass is normally screw pressed, producing solids which are dried for Meal and press liquor or stick water. The correct treatment of the stick water to recover the maximum amount of oil and fine solids is of great importance and here De Laval Equipment plays a vital part. The extent of the use of De Laval Equipment is illustrated in the flow diagram and the individual components are as follows :—

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4. **De Laval Nozzle Separators** maintaining a continuous 3-way separation of oil, water and sludge.
5. **Alfa-Laval Easy Clean Centrifugal Pump** for pumping the separated oil through the Heat Exchangers.
6. **De Laval Oil Purifiers** giving the highest degree of final purification to the oil before passing to storage.

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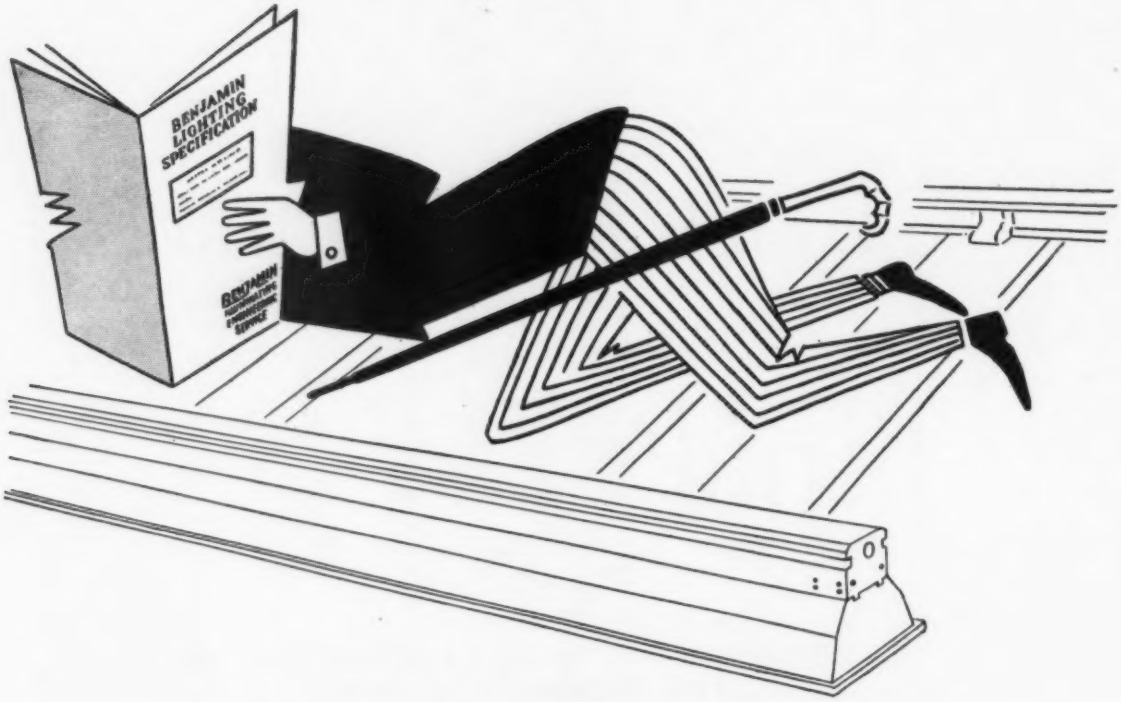

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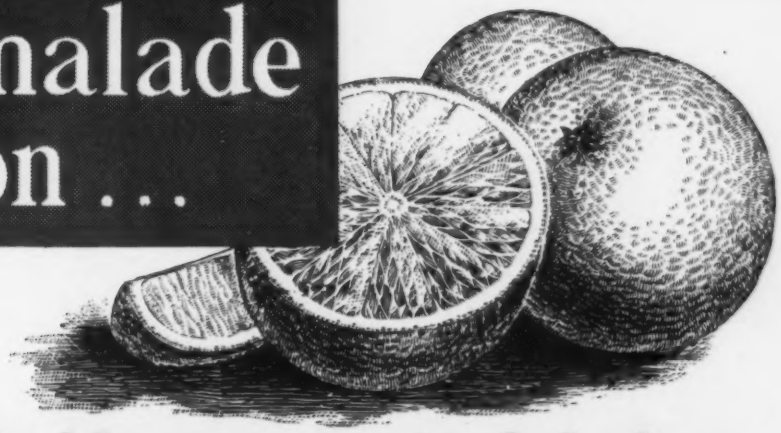

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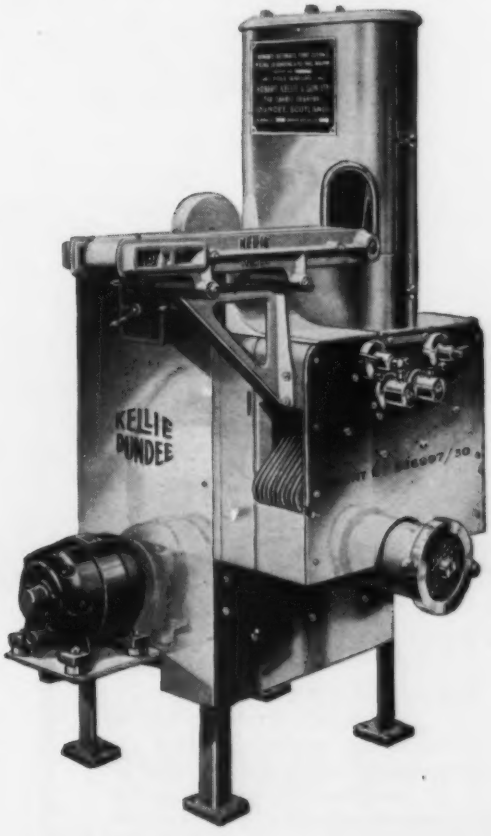
Peel, fruit pulp and juice are delivered separately at 12 lbs. per minute. The labour costs for this output SHOW A REDUCTION OF OVER 90% over handwork. This alone would enable the cost of the machine to be recovered in a few weeks.

The risk of skin disease to workers is absolutely eliminated with this machine.

Arranged for direct coupled electric motor or belt drive with fast and loose pulleys.



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1 QUARTERS
2 PEELS
3 SEPARATES
4 PULPS

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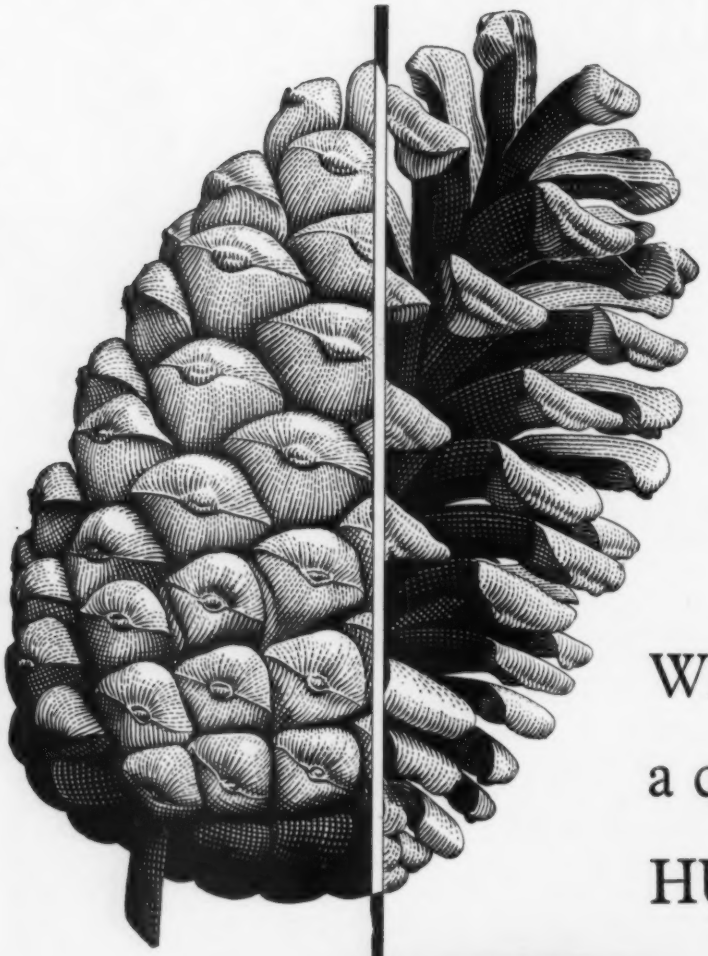
Telephones: 2819 DUNDEE (2 lines) *Telegraphic and Cable Address:* "KELLIE" DUNDEE. Code A.B.C. (5th Edn.)



When it's
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Manufacturers of instruments for the indication, recording, controlling of:— Temperature, pressure, liquid level, volume, specific gravity, humidity, etc. Also meteorological and aircraft instruments.

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Telephone: REGent 3406. Telegrams: Negretti, Piccy, London.
BRANCHES: Birmingham, Cardiff, Glasgow, Leeds, Manchester, Nottingham.
Agents or Subsidiaries in most countries.

These sweets are in perfect condition and will stay that way for a long, long time because they are packed in 'Visqueen' film. 'Visqueen' keeps out moisture and keeps in goodness.

'Visqueen' is transparent, flexible, and tough. It looks good and it feels good. 'Visqueen' completely protects sweets at every stage of their travels from factory to customer—whether in bulk or retail packs.

'Visqueen' is the first polythene film in the packaging industry which will not pick up dust. 'Visqueen' film now has a special surface treatment to disperse static electricity and prevent dust from adhering.

Specify 'Visqueen' C for printed bags which will publicise your brand and name before and after sale.

VISQUEEN *film*

PROTECTS AND PRESERVES

Let us give you the names and addresses of 'Visqueen' converters who can supply the exact package to suit *your* requirements.

VisQueen **POLYTHENE FILM**

—a product of British Visqueen Limited, Six Hills Way, Stevenage, Herts.

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OLYMPIA JAN. 18—28

STAND 5 ROWS F & G

Liquid process control by **MEASUREMENT**

1½" S 7. stainless steel meter with screw on flanges and 12" vertical index.

When you require to measure bulk or batch quantities of edible liquids, oils, spirits and solvents, hot or cold water, we can supply meters with summating, resettable, electrical presettable, direct reading or pointer type index attachments (as illustrated) and control equipment.

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INDUSTRIAL **LIQUID** *METERS*

(A COMPANY OF THE PARKINSON & COWAN GROUP)

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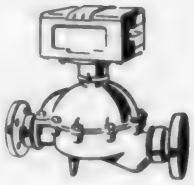
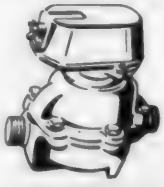
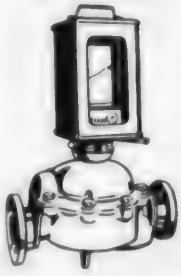


BOX TYPE COUNTER
Re-settable batch-dispensing counter with 7-digit cumulative total register.

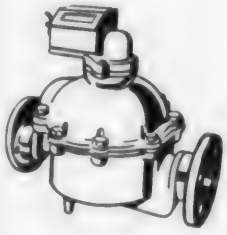
6" VERTICAL RE-SETTING INDEX
Can also be used to pre-set a determined quantity, with electric trip to operate solenoids pumps, warnings, etc.



ZEROSET INDEX
Simple turning motion re-sets indicator to zero.



MECHANICAL RECORDER
Gives a graphic record on 5" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



PREDEX CONTROLLER
Automatic means for continuous dispensing of fixed quantities of liquids.

Production of confectionery of unvarying high quality, irrespective of weather conditions, demands equally reliable cooling and air-conditioning equipment. Storage of bulk ingredients, setting of block chocolate and of couverture after enrobing, chilled water for toffee tables, and conditioning of packing rooms are just a few of the ways in which YORK refrigeration could serve you.

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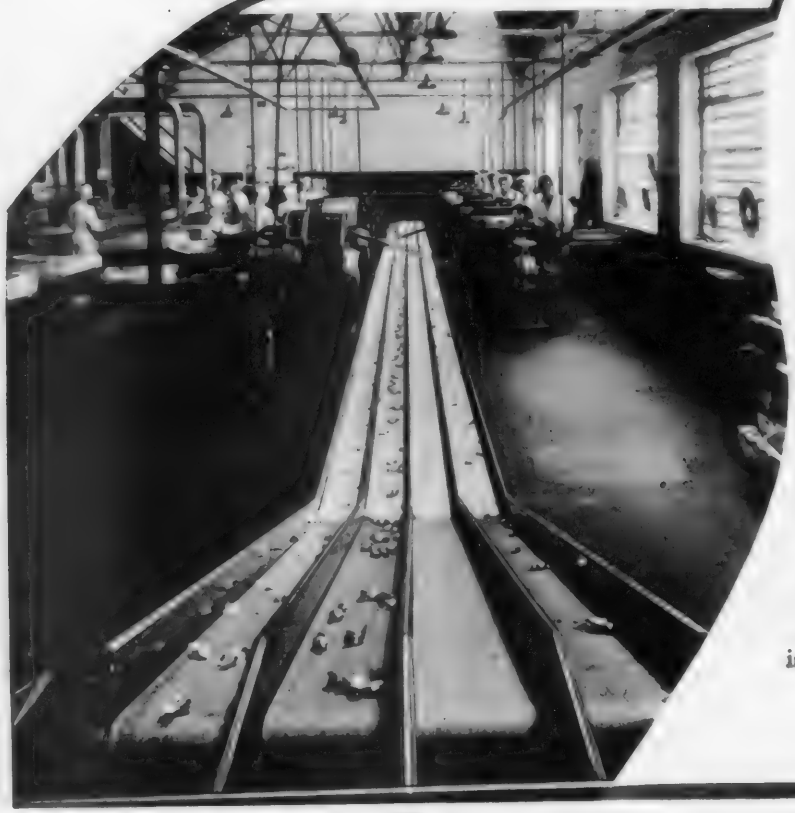

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A combination of three different types of ventilators was used to result in a continuous high rate of air change without cold draughts and with local supplies of air movement for man-cooling purposes—the ideal solution to the problem.

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FREE MANUAL—*with full specifications of the wide range of Colt Ventilators is available on request from Dept. S32/260.*

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Temperature Measurement

Brown ElectroniK instruments are performing in modern factories throughout the world with a speed . . accuracy . . and sensitivity never before thought possible. ElectroniK instruments replace mercury or vapour thermometers and ordinary wire takes the place of capillary tubing. Complete interchangeability of thermocouples and resistance thermometer bulbs excludes the possibility that a vital instrument in the process line will be inoperable because of breakage. Brown ElectroniK temperature measuring instruments can be mounted at a distance from a process without sacrificing response speed or measurement accuracy. ElectroniK measurement concentrates ALL essential information on one panel to increase operating efficiency.

Features of ElectroniK Instruments

- Capillary Tubing eliminated
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- Measurement at a distance
- Centralised recording
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- Greater sensitivity
- Higher accuracy
- Faster response

For further information on ElectroniK instruments write to Honeywell-Brown Ltd., 1 Wadsworth Road, Perivale, Greenford, Middlesex.

Sales Offices: London Glasgow Birmingham Sheffield Manchester Amsterdam Brussels Cardiff Frankfurt/Main Middlesborough Paris Stockholm Zurich

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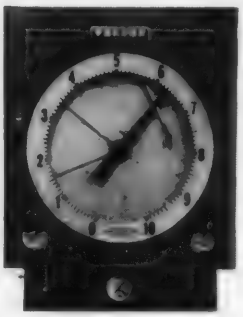
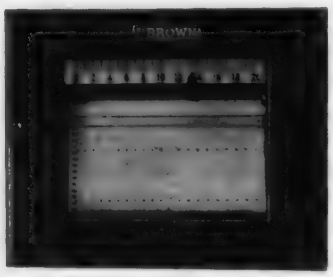
First in Controls

Brown ElectroniK Single or Multi-point Precision Indicator. Self-balancing with integrally mounted push-button switches.



Brown ElectroniK Circular Chart Potentiometer Recorder Controller.



Brown ElectroniK Single or Multi-point Strip Chart Potentiometer.

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The can with the hermetic closure and perfect "reseal"

1. Hermetic Seal
2. Easy opening
3. Opening key supplied
4. Smooth "turned-over" edge
5. Hinged lid for perfect reseal
6. Colour printing direct on to metal

Metal Box *'know-how'* does count!

THE removal of packaging restrictions allows this entirely new type of can to be supplied freely for the first time—and Metal Box capacity for quantity manufacture means that it is available at an economic price. The Collar Can has advantages for both manufacturer and consumer. It gives hermetic sealing. It is opened easily with the key provided. When opened the equivalent of a neat hinged-lid gives an efficient and convenient reseal. High quality surface decoration, printed direct on to the metal, can add sales and advertising value.

The Collar Can is precision made and designed for high speed filling and closing operations. It is ideally suited for most types of powders, solids and granulated products that need a hermetic seal to preserve freshness and flavour. An ingenious can proving that in container design and production Metal Box "Know-How" does count!

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Metal Containers · Paper Products · Flexible Packages · Plastic films and Laminates

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So far as the housewife is concerned, the R.O. Seal is anonymous. But this efficient closure bears more famous brand names than any other. If you want *your* product to be carried regularly in her basket, make sure it has the security and ease of opening and re-closing that she wants. Each R.O. seal is thread-moulded to the individual bottle or jar to which it is married. This means that it *must* fit and *must* give the perfect hermetic sealing which alone ensures factory-fresh, leakproof contents. In plain or pilferproof styles—attractively coloured and finished to your design. Samples and fully illustrated brochure sent free on request.

thanks to the R.O. Seal

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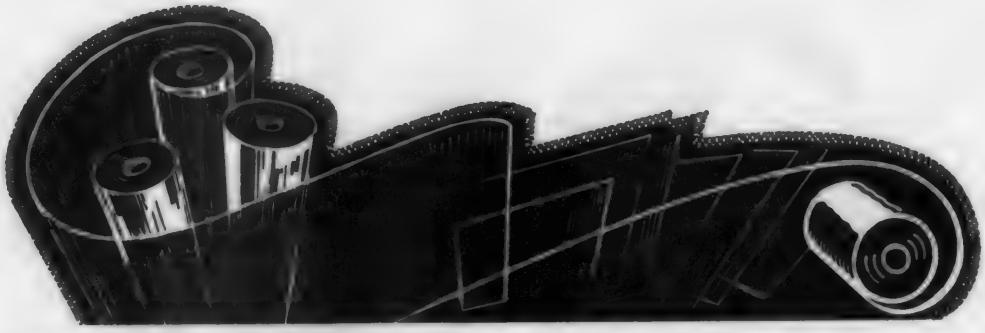

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How many transparent films are required to give a complete packaging service? At British Cellophane Limited the answer has always been, "It depends on the needs of film users".

For this reason, "Cellophane" cellulose film, throughout its years of unequalled progress, has been produced in *over forty* different types, gauges and colours, and other complementary films have been added by the Company which has earned the title "Specialists in Transparent Packaging".

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Modern plant and the greatest care in production ensure that 'Edicol' Supra Colours are absolutely pure. These colours enable manufacturers to achieve in their products the standard of purity demanded by the most exacting authorities in the world.

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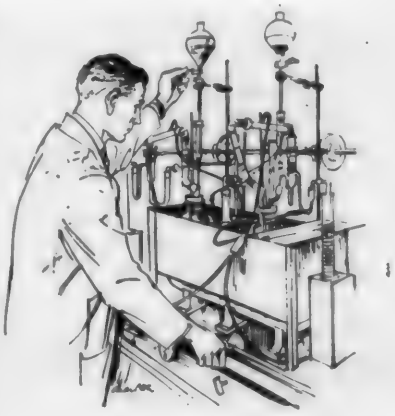
'Edicol' Supra Colours are manufactured under strict laboratory control at every stage. Manufacturers exporting to the U.S.A. will be particularly interested to note that 'certified' supplies of many of the colours (F.D. & C.) are available.



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D.369

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PHŒNIX
HESTON EQUIPMENT CO. LTD.

is the answer

Phœnix Trays have been supplied to answer many specific requirements in the food and confectionery industries. In every instance their supreme fitness for the job has been proven in lighter work, easier cleaning, rigid interstacking and sturdy service.

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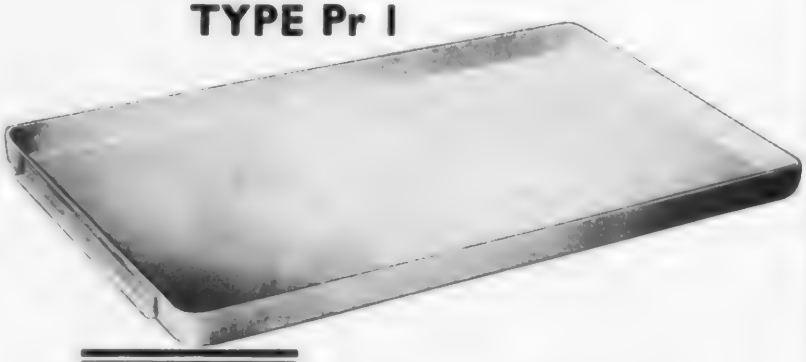
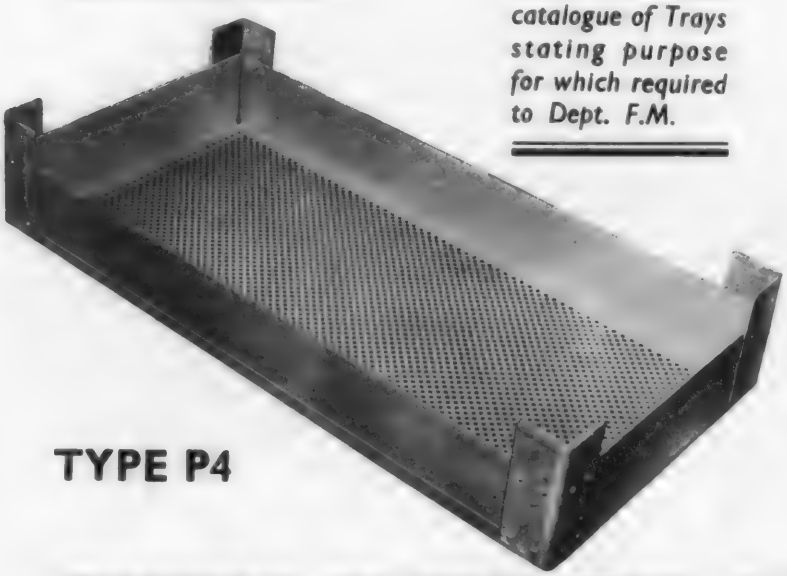
These trays have the great strength of high quality aluminium, plus the light weight that goes with it. Used widely for Biscuit and Cake processing, they have many other applications in manufacture when made to the dimensions required, with special features incorporated to customers' wishes. They can be made to interstack or not, and are the economical answer in hygiene, long service and easy cleaning.

TYPE Pr 1



Send for illustrated catalogue of Trays stating purpose for which required to Dept. F.M.



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Precision manufactured in highest grade aluminium with perforated base integral with sides and ends. Reinforced corner angles are designed for accurate interstacking, leaving lifting space between stacked trays for easy handling. Used for many purposes where cooling and hygiene are of paramount importance, e.g., Restaurant crockery trays; Processing with sugar confectionery; Nut sorting and a wide variety of other uses.

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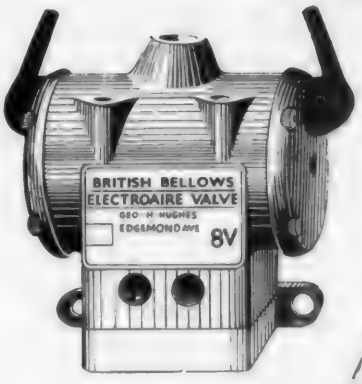

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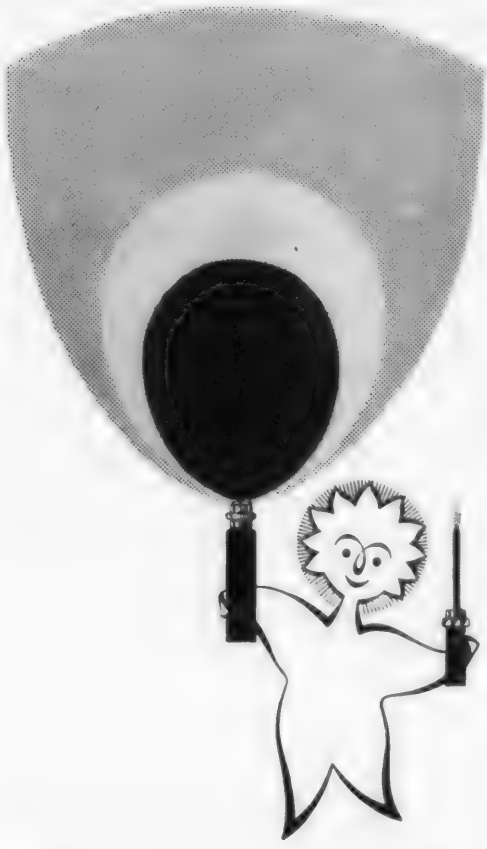

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Some industries need a flame 20 feet long, others a mere pencil point of heat. Gas provides both and every gradation in between—a complete heat service for industry, clean, constant and infinitely controllable. The adaptability of gas is a virtue which can reward the user with lower production costs. However you put it to use, you pay only one bill for your gas. You do not have to budget for storage costs or space nor, unless your needs are exceptional, for special handling equipment and the concomitant labour. If yours is one of the 4,000 industrial processes already served by gas, you may find ideas for increasing efficiency in the latest advances in gas technology; if it is not, it could become the 4,001st. Either way the Gas Industry welcomes your inquiries.

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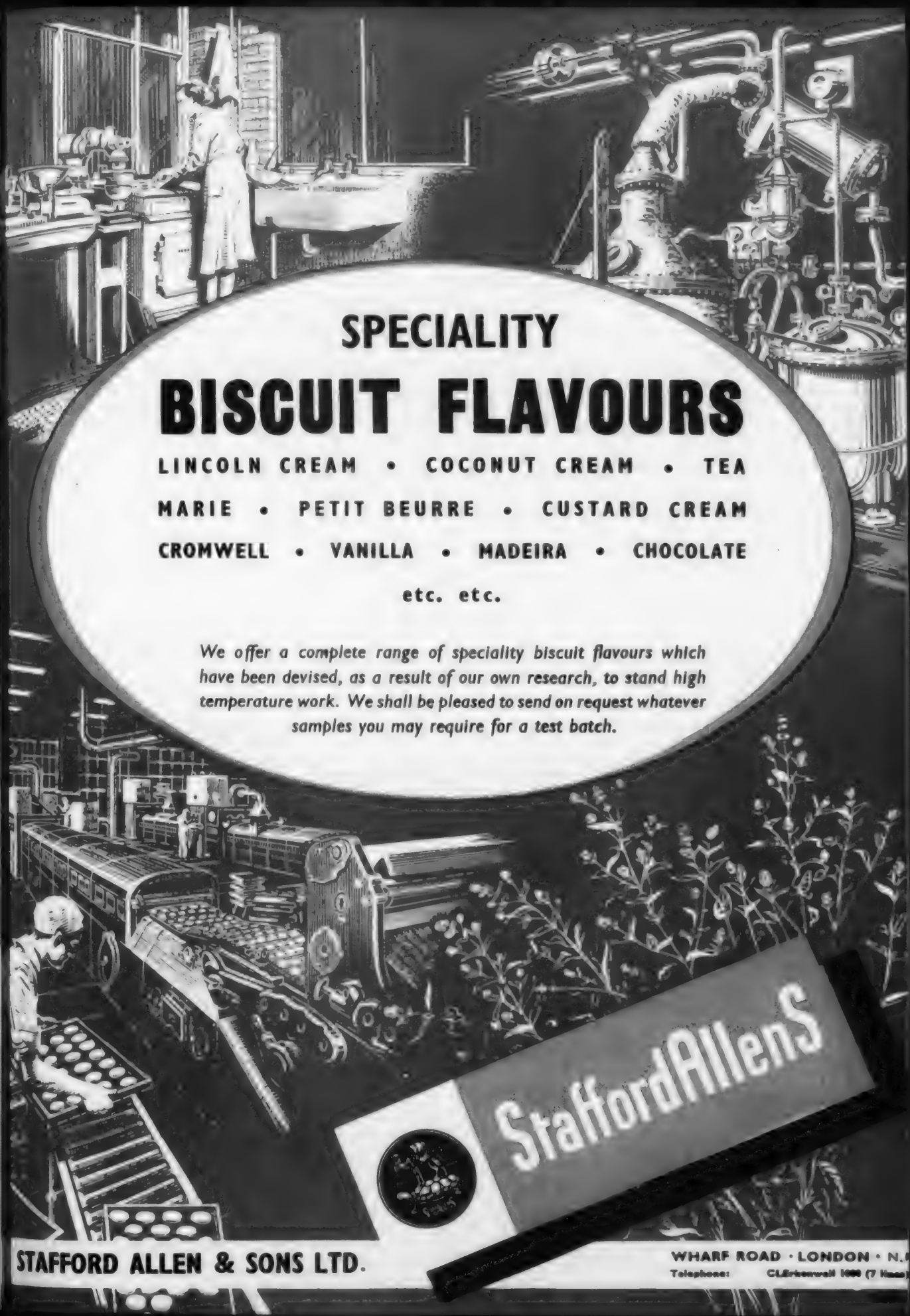
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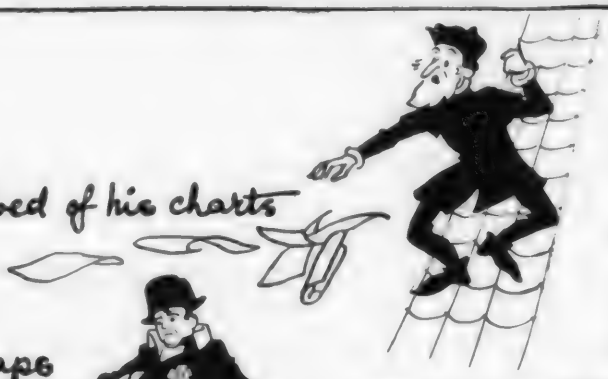
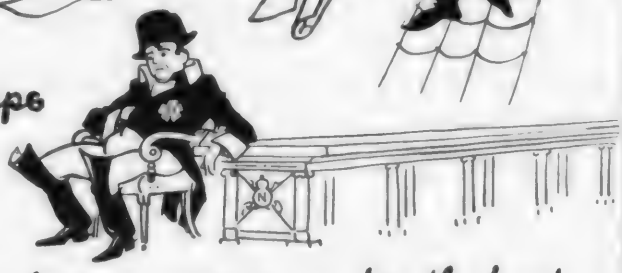
We can easily imagine

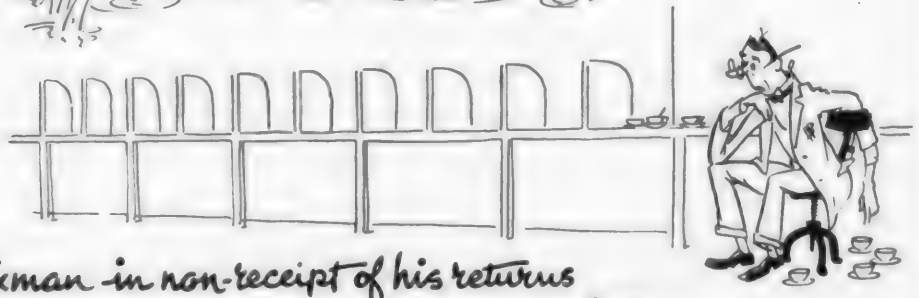
Christopher Columbus deprived of his charts



or Napoleon minus his maps

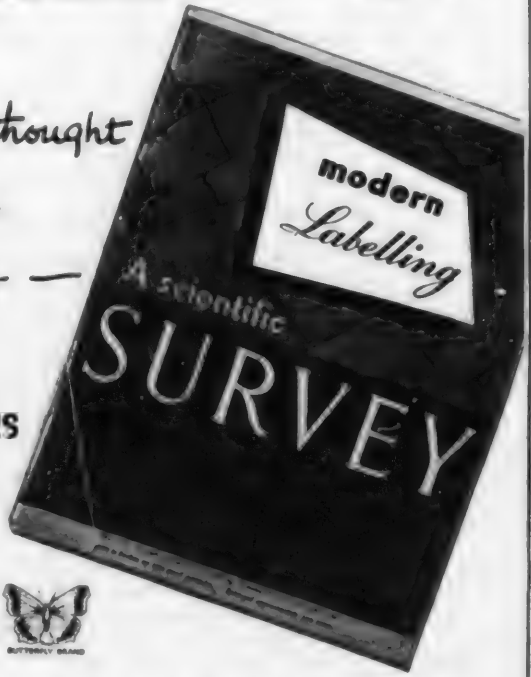


or Izaak Walton parted from his fly-book



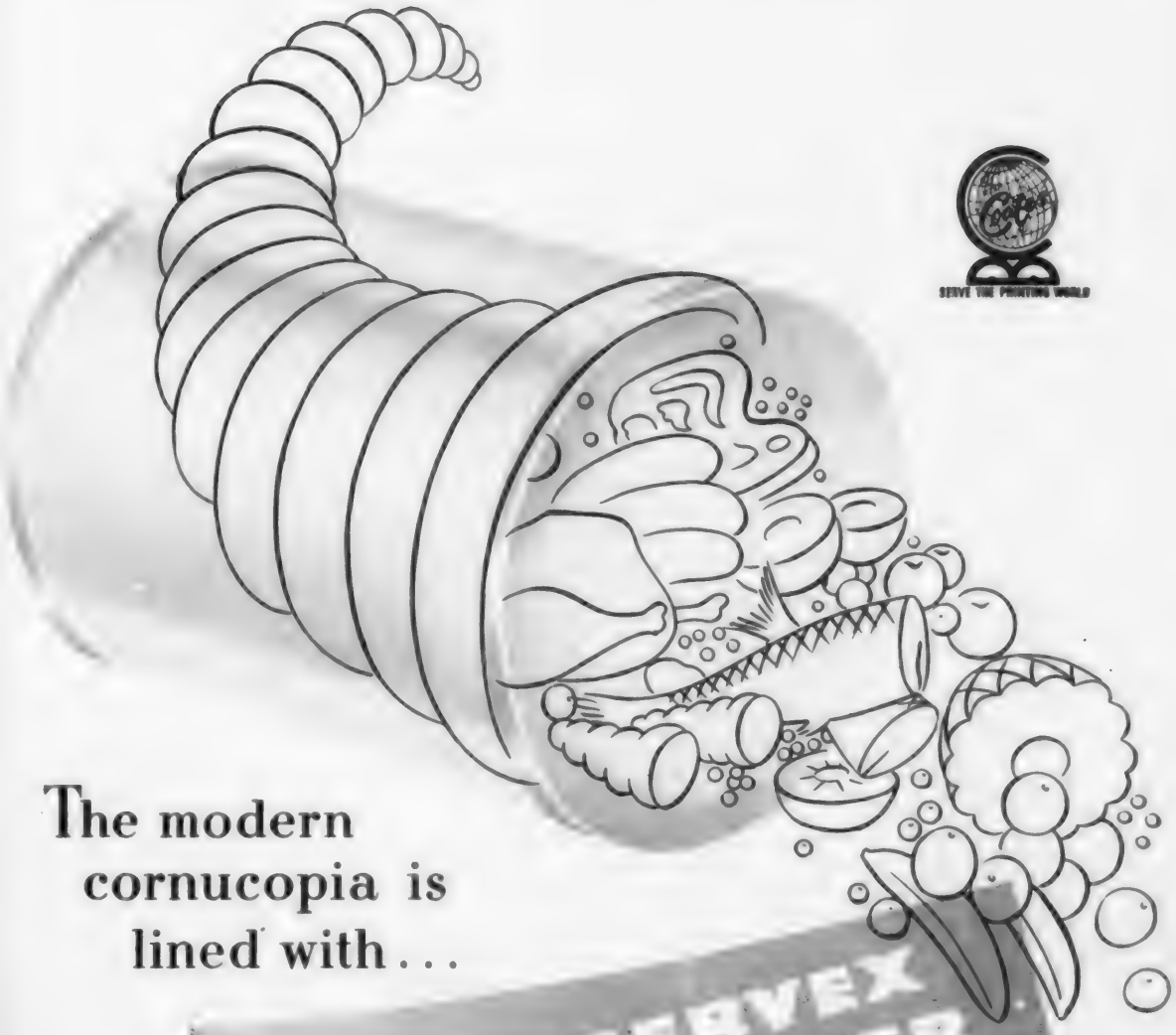
or even the taxman in non-receipt of his returns

But
we are utterly shattered by the thought
of the Manufacturing Executive
without a copy of —



We therefore invite those
EXECUTIVES of MANUFACTURING CONCERNS
who have not already done so,
to send for one of the remaining copies
of this **IMPORTANT MONOGRAPH**

SAMUEL JONES & COMPANY LTD.
NEW BRIDGE STREET · LONDON · E.C.4 · CEN: 6500



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Coates PRESERVEX M.U. LACQUER

The most satisfactory universal canning lacquer on the market. Preservex M.U. Lacquer gives maximum protection to all kinds of food under the most severe retorting conditions. It adds a decorative finish which attractively sets off the contents. Full stoving details will be sent on request.

COATES BROTHERS INKS LIMITED

EASTON STREET, ROSEBERY AVENUE, LONDON, W C.I.

Telephone: TERminus 2810 Telegrams: Inkstone, Kincross, London

Visking

CASINGS

The famous crystal-clear cellulose Visking food and sausage casings are NOW available through Viskase Limited, a Company formed in conjunction with the Visking Corporation of America for the manufacture and distribution of VISKING products in Gt. Britain and overseas.

Write for full information regarding
Visking — Standard Stretch — High Stretch — Zephyr — Fibrous casings
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VISKASE LIMITED
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We are exhibiting at the PACKAGING EXHIBITION, Olympia, 18th-28th January, Stand No. 9, Outer Row, First Floor.

'VISKING' IS THE REGISTERED TRADE MARK OF THE VISKING CORPORATION

SCANDURA P.V.C. belting

helps the food industry

Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)

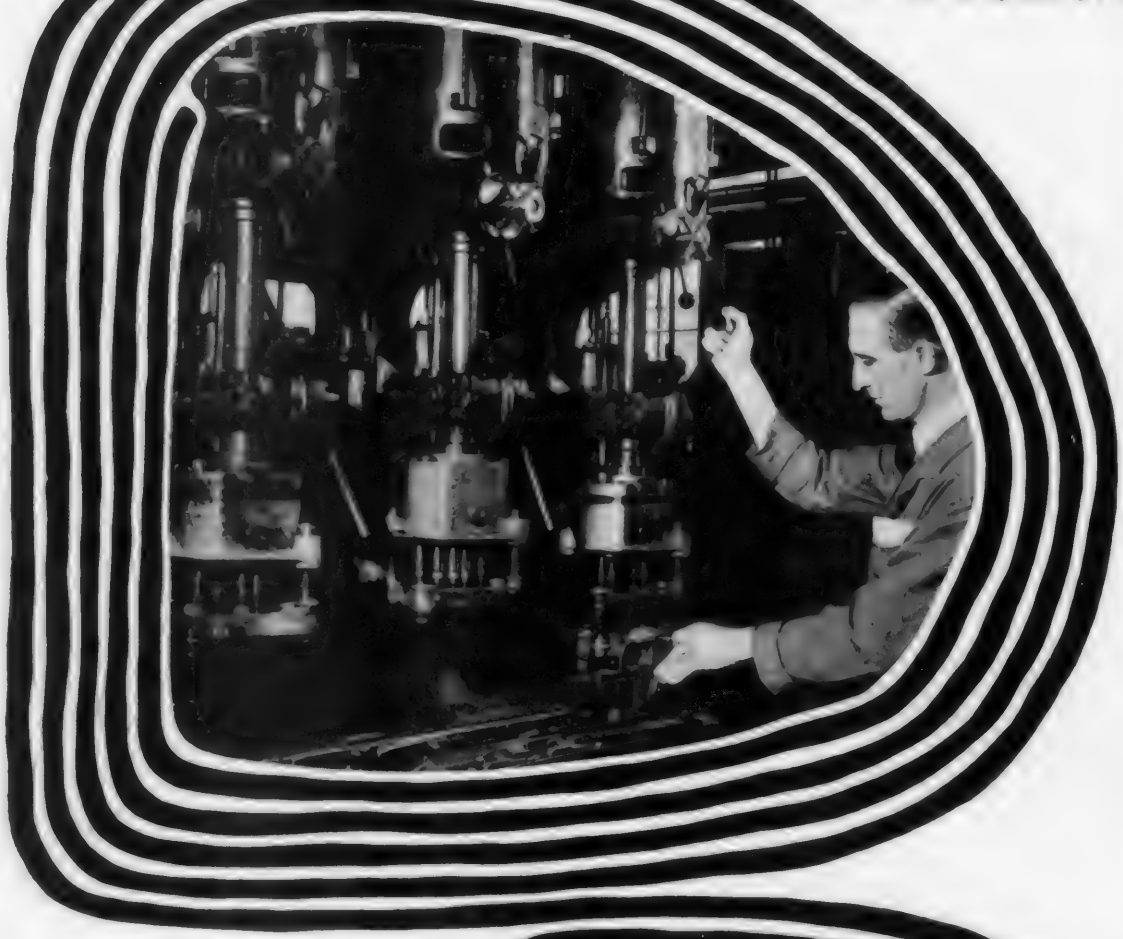
Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

SCANDURA P.V.C. BELTING IS MANUFACTURED BY **BBA**

BRITISH BELTING & ASBESTOS LIMITED · CLECKHEATON · YORKSHIRE

Having a hand in Productivity



In every industry or trade, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry — produced by the Electrical Development Association.

E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free) and the Electricity Boards (or E.D.A. themselves) can supply you.

Individual Drive

Individual drive means power exactly where it is wanted. The motor is built into the tool and direct coupled to the driven shaft. Efficiency is higher, floor space is saved, belts are done away with. The machine is a self-contained unit and the drive is direct. There are no gears, no belts—so maintenance is low.

Individual drive means that the motor is tailored to the tool—control is simplified and there is no waste of power. The tool does the work at the highest speed and the lowest cost: lowest in maintenance, lowest in rejects, lowest in power consumption. Putting the power where it is wanted is—

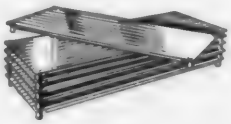
only one of the aids to higher productivity that Electricity can bring you.

Electricity a Power of Good for PRODUCTIVITY

The British Electrical Development Association, *2 Savoy Hill, London, W.C.2*

The CHIEF ENGINEER says—

'Strong-light-clean-smooth-easy stacking WARWICK has everything'



Stacking Containers

Range now extended: CS.24157—23½" x 14¼" x 7¾"
CS.24155—23½" x 14¼" x 5½"
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Strong Alloy One Piece Pressings. *All sizes will interstack*

- ★ Absolutely hygienic and easy to clean
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- ★ Positive stacking by extra deep swage
- ★ Available with or without base drainage holes
- ★ Larger size in 16 gauge, smaller size 18 gauge Aluminium Alloy
- ★ Lids also available, common to both sizes

Other effective depths between 3½" and 7¾" can be offered in 16 gauge or 18 gauge providing reasonable quantities are required.

WARWICK PRODUCTION COMPANY LTD

IN ASSOCIATION WITH **ALMIN LIMITED** FARNHAM ROYAL BUCKS

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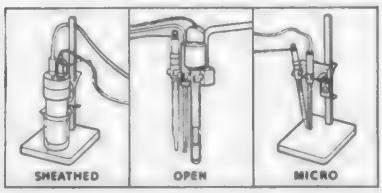
Ask users about the

PYE pH METER
AND MILLIVOLTMETER
DIRECT READING — MAINS OPERATED



Electrode Kit to make up all the assemblies illustrated and all necessary accessories are supplied complete with the instrument.

Many leading industrial laboratories are using the Pye Universal pH meter and millivoltmeter to their complete satisfaction. Read what The British Aluminium Company Limited says:

". . . we write to inform you that our recommendations for the purchase of a number of these equipments for use in our Routine Laboratories have been accepted. You can expect, therefore, within the next week or so to receive orders from a number of our factories. . . . We feel you would like to hear from us this tangible proof of how satisfactory we found your instruments."

Signed: Director of Research.

May we send you details of this and other instruments in our comprehensive pH range ?

STANDARD EQUIPMENT IN MANY LEADING LABORATORIES

SCIENTIFIC PYE INSTRUMENTS

W. G. PYE & CO. LTD., GRANTA WORKS, CAMBRIDGE, ENGLAND

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AVAILABLE NOW . . .

B·C·L

"K" POLYTHENE

POLYTHENE PLUS EXCELLENCE IN PRINTING

A Triumph in Research

For many months the technical experts of British Cellophane Limited have applied their skill and knowledge of packaging materials to the task of developing a B.C.L. polythene film which could be printed with ease and success.

They have now produced B.C.L. "K" POLYTHENE—a polyethylene film KEYED to accept printing inks readily and hold them permanently.

Thus, to the well-tried protective qualities of their polythene film which makes it so dependable and versatile a packaging medium, B.C.L. now add an advantage which will increase enormously its commercial possibilities.

The special process is not a coating which comes off with normal handling and use but an integral treatment of the film which leaves its purity and non-toxic properties untouched.

PATENTS HAVE BEEN APPLIED FOR

B·C·L KEYED POLYTHENE

1. Provides a receptive surface for clear, bright and durable printing.
2. Laminates more readily . . . is more suitable for pressure sensitive tapes.
3. Retains all the **toughness, moistureproofness, purity, resistance to chemical action** and **great flexibility** inherent in polythene film.
4. Is available in the usual gauges from 150 to 500, both in layflat tube and roll form.

AT NO EXTRA COST!

B.C.L. polythene film which gives packaging perfection for a diversity of goods from frozen foods to machine parts and can now be successfully printed, may be the answer to your packaging problems. The scientific and technical services of British Cellophane Limited which made this great general advance possible are as readily at your disposal for your own particular needs.

Send today for samples and full details of the new . . .

B·C·L

KEYED POLYTHENE FILM

BRITISH CELLOPHANE LIMITED

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for the careful conveying of powdered, granular, flaky and small lumpy materials.

The "REDLER" En-Masse system of conveying materials is a unique yet universally accepted advance in bulk handling. The conveying element is made up of correctly spaced chain flights which carefully transport the material through the enclosed casing in a natural flow without causing dust or breakage. A single "REDLER" Conveyor will take the place of several machines of other types.

REDLER

REGISTERED TRADE MARK

EN MASSE CONVEYORS AND ELEVATORS

(Above)
A "Redler" plant handling a well-known medical product through all stages of manufacture.

(Right)
"Redler" Conveyors handling resin and wood flour at a large chemical works.

Write for the Redler Catalogue to:—

REDLER CONVEYORS LIMITED

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LONDON OFFICE 47 VICTORIA ST SW1 TEL ABBEY 2756 TELEGRAMS REDLERING SOWEST LONDON

T&N *Precision-built*

CORRUGATED CONTAINERS

A PACK precision-built by Thompson & Norris earns respect everywhere and saves money all round. Because of its cushioned protection and made-to-measure compactness, safe transit is assured, freight and storage costs reduced. It folds flat, can be easily assembled and quickly sealed.

Thompson & Norris are Britain's largest producers of corrugated fibreboard containers. Many world-famous products are clothed in packs of our design and manufacture. Your product, too, deserves a good pack. Our expert knowledge is at your service.

THOMPSON & NORRIS

Pioneers of Corrugated Packaging

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Telephone: EALing 4555

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Factory also at HISTON, CAMBS.

WE ARE EXHIBITING AT THE **Packaging Exhibition** By Provincial Exhibitions Ltd 18-28 Jan. '55 National & Empire Halls OLYMPIA London

DIVISION OF Reed PAPER GROUP

Let our Packaging Engineers give YOU the answer with scientifically produced cases, individually designed for YOUR products.

The experience and vast resources of Thompson & Norris as pioneers yesterday and leaders today of the Corrugated Fibreboard Industry, are available to YOU without obligation.

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Acacia ✕ Karaya

The experience we have gained as one of the oldest and largest direct importers, enables us to maintain without variation a guaranteed viscosity of our powdered Vegetable gums.

On our modern grinding plant, we produce all grades from kibbled or coarse to the finest powders.

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Mucilage · Emulsification · Suspension

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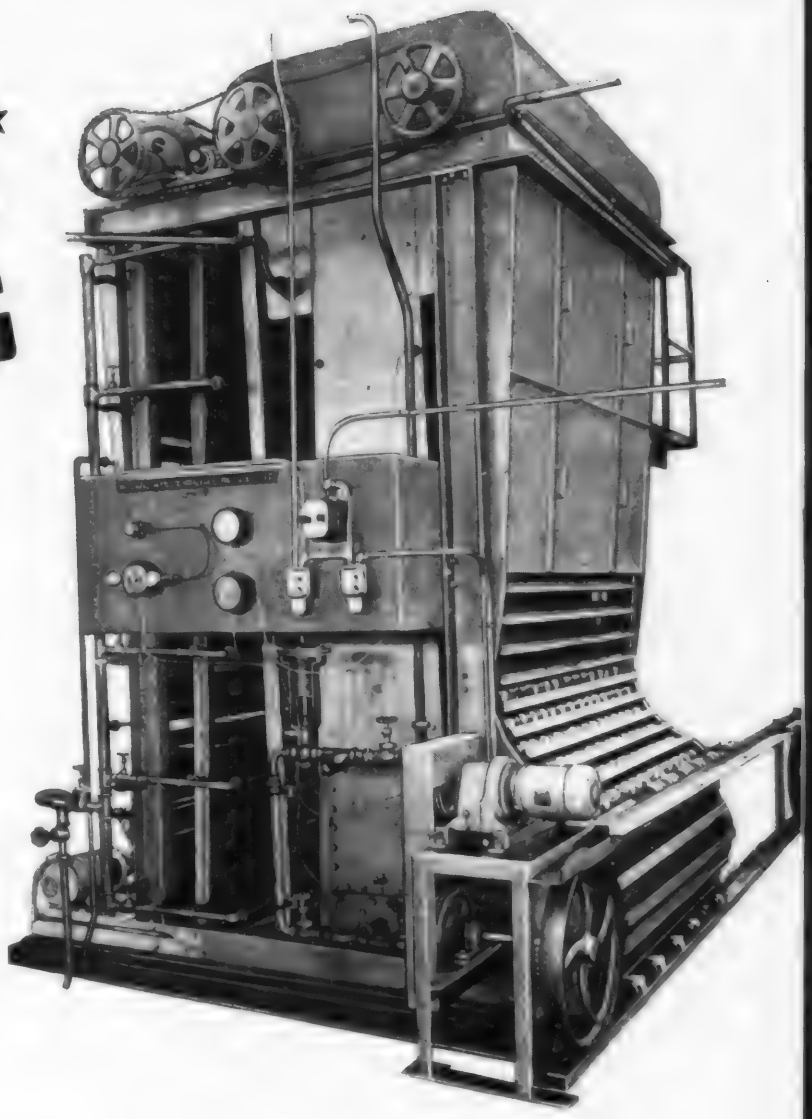
A revolution* in CANNING



NEW

fruit processing technique produces BETTER quality packs and LARGER outputs

for
- **RASPBERRIES**
- **STRAWBERRIES**
- **LOGANBERRIES**
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- **PLUMS**
- **CITRUS FRUITS**
- **PEACHES**
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- **FRUIT SALADS, etc.**

OUTPUTS from 65 - 260 CPM

STANDARD RANGE A2½'s · A2's · No. 1 Talls
E1's · A1's

UNIVERSAL RANGE
A2½'s · A2's · No. 1 Talls · A1's
E1's · ½No. 1 Talls · 8 oz. · 5 oz.

THE OLD METHOD

FULLY AGITATING

*To produce a first quality pack, agitation should be at a **minimum** during the critical sterilising and cooling periods.*

★

THE NEW METHOD

INTERMITTENT AGITATION AT CERTAIN POINTS

Provides the BEST possible sterilising conditions for BETTER quality packs, and OPTIMUM performance with a LARGER output.

Mitchell-Webster

HYDROSTATIC Fruit Steriliser

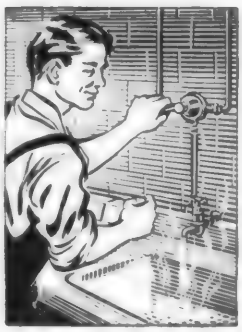
MW1

For full details write to:

MITCHELL ENGINEERING LIMITED, *Dept. G.,*
Food Machinery Division, **7 GOWER STREET, LONDON, W.C.1.**

INSTANT HOT WATER FROM STEAM

with automatic temperature control



Hot water, plenty of hot water from tepid to very hot, instantly, cheaply — that's what you want and that's what you get with a Leonard Thermostatic Steam Water Heater. Hot water is made only when it is wanted and where it is wanted. There are no heat losses through storage or radiation. No expensive piping or equipment required. The Leonard Thermostatic Steam Water Heater is easily and quickly installed — no upsets, no delays. It is widely used in Laundries, Tanneries, Textile Mills, Breweries, Dairies, and other Food Industries, Tinplate Works, etc.

Write for leaflet No. 9/S

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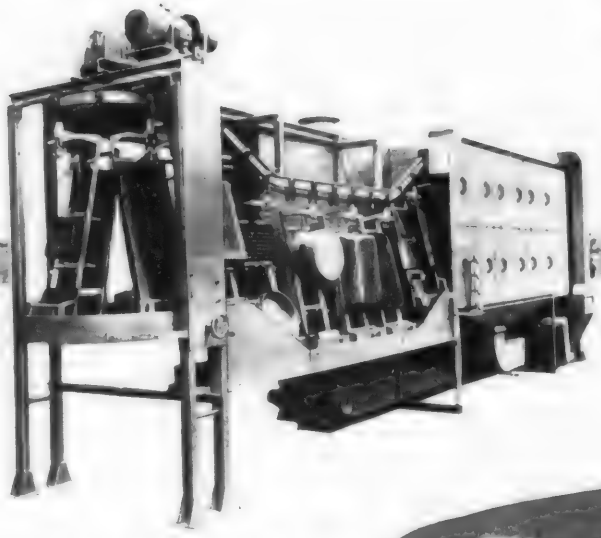
(PATENTED)

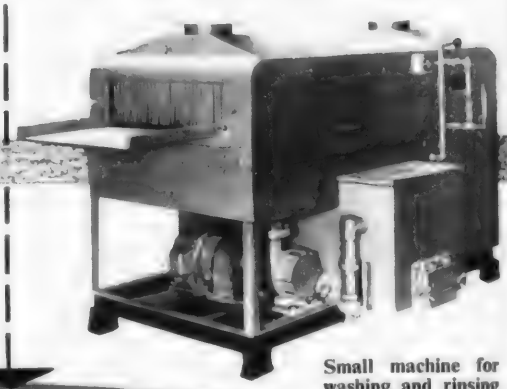
PERMUTIT
provides Demineralised Water
for Food Manufacture
For critical needs in food preparation, distilled quality water is essential, but distilled water is expensive: its production uses heat or steam.
The modern substitute is demineralised water, produced at only a small fraction of the cost of distillation by "Deminrolit" Ion Exchange.
"Deminrolit" plants are made in all sizes from Portable units to larger fixed installations, similar to the one shown here. If you would like to have them, we will gladly send full technical details.

The **PERMUTIT Company Ltd.,** Dept. W.L.210, Permutit House, Gunnersbury Avenue, London, W.4. CHIswick 6431

WASH



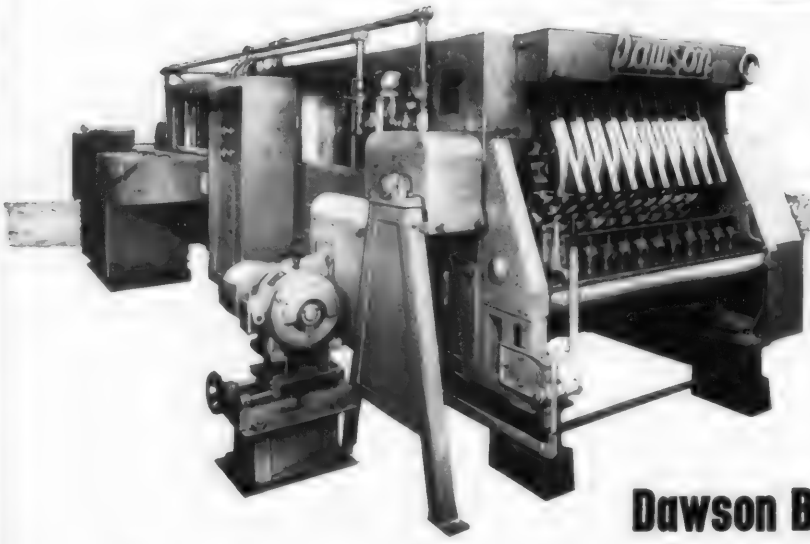
A monorail machine for washing, rinsing and drying varied Food Utensils.



Small machine for washing and rinsing Bakers' Trays.

ESTABLISHED 1864

The Quick, Economical
Dawson
Hygienic way

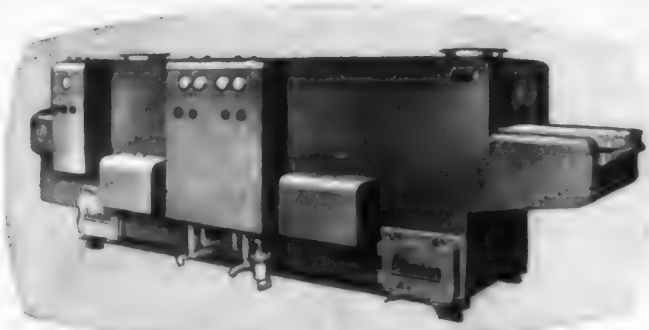


A Bottle and Jam Jar washing, de-labelling, rinsing and sterilising machine.

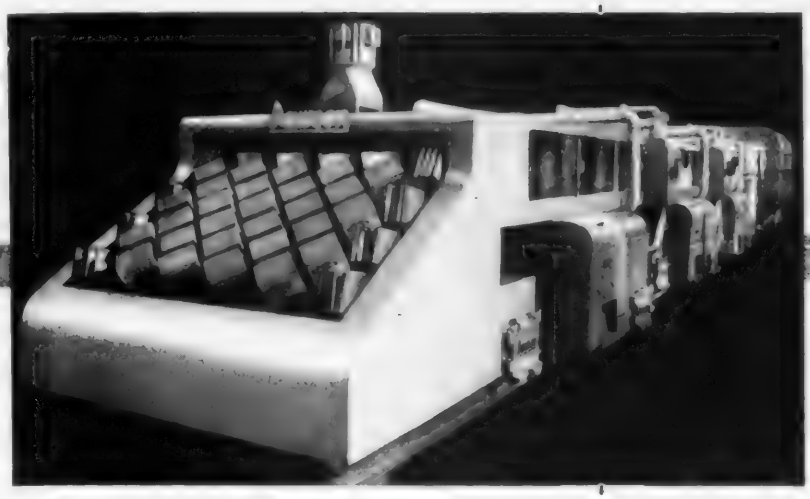
Tel.: Cleckheaton 1080 (5 lines)

Dawson Bros. Ltd., Gomersal, Nr. LEEDS

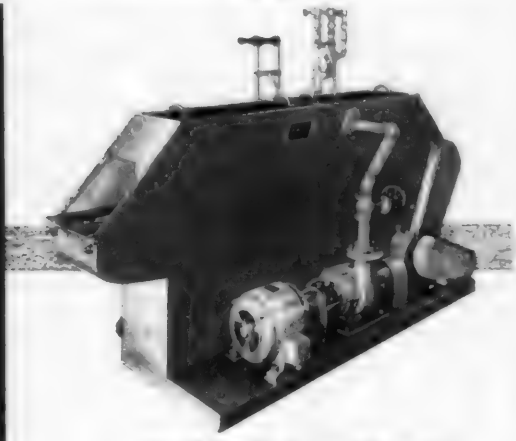
CLEAN



Washes, rinses and sterilises 200—300 trays per hour.



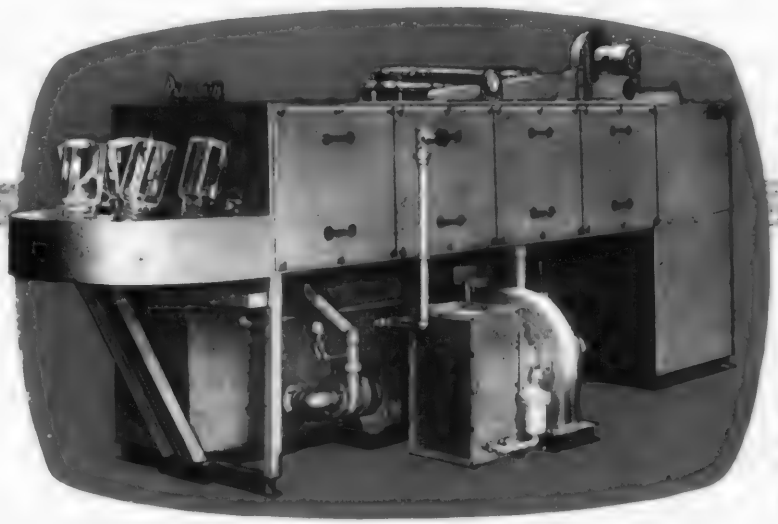
For washing and de-labelling and drying biscuit tins and lids. Capacity 2,000 per hour.



Small Can Washer and Rinser for 30—60 cans per minute.

Make sure that every type of container and utensil used in the manufacture of Food Products is clean, sterile and satisfies Health Regulations.

Dawson washing plant is used extensively today by manufacturers of all types of Food products. Whatever the size or shape of tin, can, tray, jar, bottle, container, mould or food utensil Dawson machines will wash and dry these articles in the minimum time for the lowest cost. Let us know what you have to clean and we shall be pleased to advise you.



A Rotary Jar and Tin washing and drying machine. Capacity 150 per hour.

London Office:
406 Roding Lane South,
Woodford Green, Essex.
Tel.: Wanstead 7777 (4 lines)

Pattinson's REGISTERED BRAND PRODUCTS

for the
FOOD
Industry

The remarkable covering power of **PATTINSON'S LIGHT MAGNESIUM CARBONATE** *(one gramme having a surface area of 35 square metres)* has resulted in its increasing use in the salt industry, to promote free running by the dual action of separating adjacent salt crystals and by absorbing filamentary water.

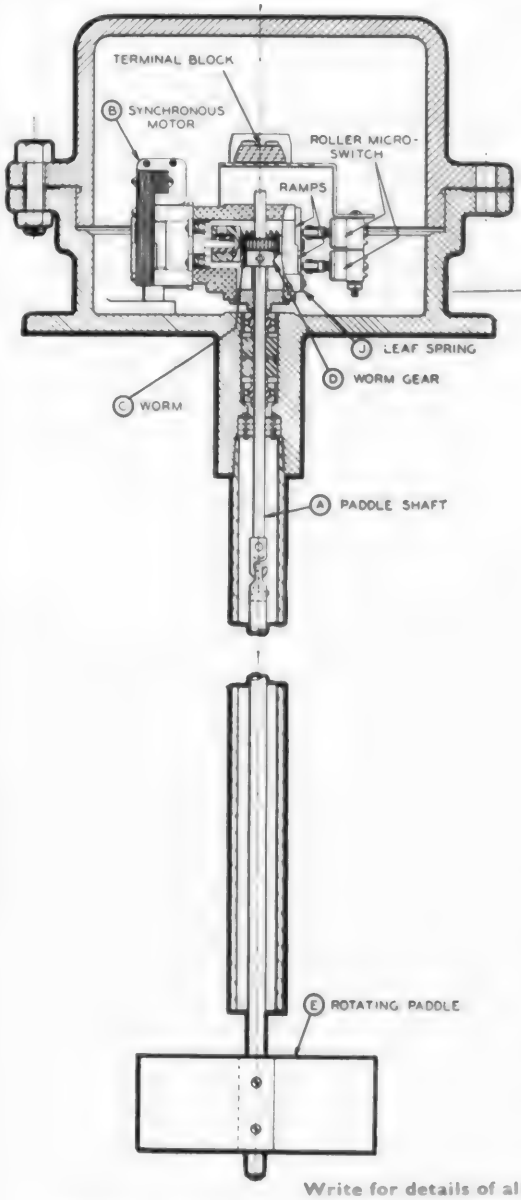
Our Sales Technical Department would be very pleased to advise on the uses of this chemical in any powdered product where free running qualities are desirable.

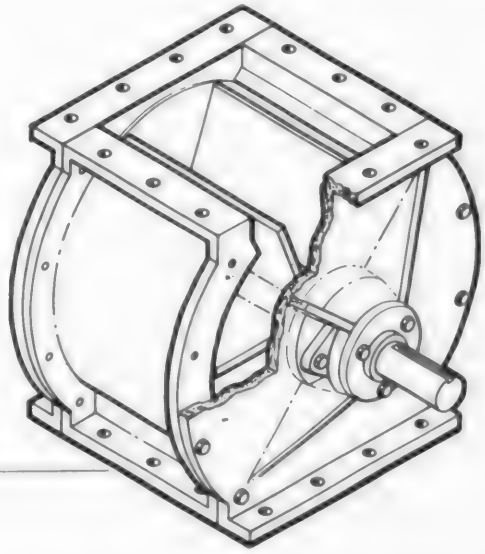
THE WASHINGTON CHEMICAL CO. LTD.

A member of the TURNER & NEWALL ORGANISATION
WASHINGTON · CO. DURHAM · ENGLAND

Controlled Flow

THE FULLER MATERIAL-LEVEL INDICATOR is used to indicate or control the level of dry pulverized, fine, crushed and granular materials passing into or out of a bin, silo, or bunker; or through a conveyor, spout, or similiar device. It may be used to control or operate such equipment as a valve, elevator, conveyor or a feeder (below) by starting or stopping the motor driving the equipment, when a predetermined material level is reached. It is not affected by a momentary surge of material in a bin, neither will it give a false indication by the settling of an aerated pulverized material.





THE FULLER VANE-TYPE FEEDERS for handling pulverized and granular materials are employed wherever controlled flow and discharge of materials from bins, silos, etc., is required. They may be used as air locks for positive or negative pressure differentials and are available in capacity ranges to meet normal plant requirements and are built with circular or rectangular outlets.

Write for details of all Fuller pneumatic handling equipment including the F-H Airslide

Telephone:
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0637-8.

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Sole licensees of Fuller Co., Catasauqua, Pa., U.S.A., for manufacture and sale of Fuller equipment in Great Britain.

Reigate

Brand

ESTABLISHED 1841

PURE VEGETABLE CHOCOLATE COLOUR

EXTRA CONCENTRATED

This colour is guaranteed to be entirely natural and free from any artificial or aniline dye. This is the strongest, richest and most economical preparation of its kind, and is very stable under high temperature.

Recommended for: **FONDANT, ICING, SWISS ROLLS, SPONGES, Etc.**

A Natural Product in a form which can be easily and conveniently and economically used by our customers.

We are specialists in this field and for full details of our Range of Natural Colours, write:

WHITE, TOMKINS & COURAGE, LTD

NORTH ALBERT WORKS, REIGATE

Telephone: Reigate 2242/3 *Telegrams:* ESSWHITE, REIGATE

FASTER MACHINE SPEEDS

yes! with faster setting adhesives

National

AT THE
Packaging Exhibition
By Provincial Exhibitions Ltd.
18-28 Jan. '55
National & Empire Halls
OLYMPIA
London

STAND No. 7, ROW R
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EMPIRE HALL

YES!

We would like your technical representative to call and give us fuller details of how National quick-setting adhesives can speed our production

All enquiries to Department "B"

NATIONAL ADHESIVES LTD., SLOUGH, BUCKS
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Name_____

Address_____

BOWATERS PACKAGING

Come to the Fair!

MAKE A NOTE now (if you haven't already done so) to look in at Olympia for The Packaging Exhibition. This year's show looks like being brighter, busier and bigger than ever, with Stands in both National and Empire Halls.

There's much to see, much to do. It's a time for meeting old friends and making new ones. It's also a time to look around, an opportunity to see what's new in this lively, colourful, forward-looking industry.

And there are plenty of new things to see on the Bowater Stand on the ground floor of the Empire Hall. A brand-new fibre drum and Britain's first-ever tear-strip corrugated case are two big attractions of a display which also includes the latest refinements in multiwall sack design, the first public showing of the Bowater range of sack weighing, filling and closing equipment, new bags and many colourful and protective wrappers.

They're all worth seeing. Come along and take your pick from the up-to-date ideas on display at the Bowater Stand — No. 8, Row S, Empire Hall.

For the benefit of those who cannot get along to Olympia and as a guide to those who can, here is a preview of what Bowaters will be showing.

Beat the drum f...

A BIG welcome for this new member of the fibre drum family. It's so new that pilot-plant-production has hardly begun.

You will be hearing more about this tough young newcomer.

In the meantime, note the steel lid and locking band, the waterproof recessed base and the metal beading.

It's light, it's strong, it's rigid. Rims are protected against denting and breaking. Sides are smooth and straight — no protruding rivets or stitches.

New walls for sacks...

YOU MIGHT NOT think that multiwall sacks — basically pasted valve, sewn valve and sewn open mouth—offered a big field for development. But you would be wrong; the variations on this trio are quite remarkable.

For example, Bowaters will be showing sacks with new, hygienic *grease-resistant* inner walls — polythene coated and glassine laminated. These sacks are already being used for dried milk or desiccated coconut. And there are plenty more uses for them not only in the food manufacturing field but also in the safe, clean, economical packing of high-grade pharmaceutical chemicals, moulding and plastic powders. Bowaters

and here's the TEAR-STRIP corrugated case

Ease and speed of opening is the primary advantage of these new tear-strip cases. The case is virtually unzipped—all the retailer has to do is lift the tab and pull. Off comes the top and the contents are ready for display. No damage from knives or other opening tools; no waste of a busy retailer's time. The tray sections can be used to build displays and finally as carriers for home delivery.

THIS is a pack with a big future. As the art of retailing in this country becomes more scientific, more streamlined, this case will be used for packaging more and more groceries, toilet articles and other consumer goods. For it offers big advantages to the busy retailer—in ease of opening, speed of price-marking, display-potential, carry-home after-use, and elimination of wastage due to faulty opening.

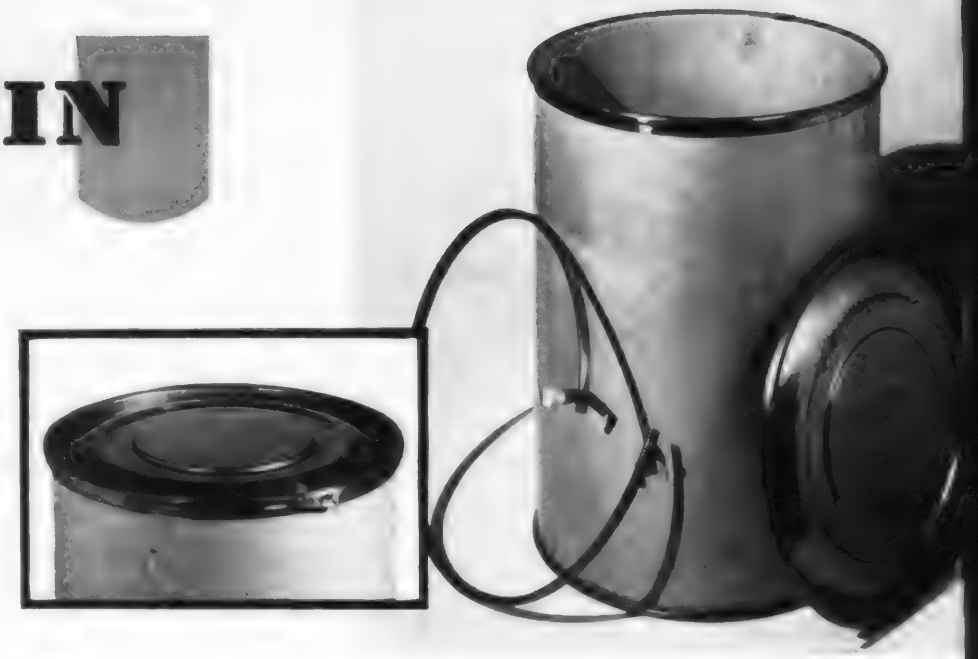
And this is only one of the corrugated case developments you can expect from Bowaters. Among other things, they're working at the Croydon factory on a wider range of weatherproof cases and a brand-new case with laminated fluting, offering even greater protection for concentrated loads.

BULLETIN

the SUPAKASK

It's a drum to bear in mind when you're thinking of heavy-duty export work.

The steel lid of the new Bowater Supakask, with its locking band and pilfer-proof clips, fits smooth and tight. (See inset). But it's easy to open and close and no vacuum is created when the lid is lifted. Makers of flocculent powders, please note.



have some ideas themselves. Have you some you'd like to talk over?

...with machines to fill and close them

SEE THE STRENGTH — and efficiency — of the machinery designed and supplied by Bowaters for the filling of multiwall sacks. They pack all kinds of free and semi-free flowing materials with superhuman accuracy and speed.

And don't go without seeing *The Best Sewing Head in the World* — the Union Special Sewing Head. By arrangement with the main British distributors, Bowaters are the only paper sack manufacturers in the United Kingdom to supply this robust machine, which provides certain, secure closure for sewn open mouth sacks. (See illustration above.)

Bags of scope

FEW PEOPLE in this country could supply a complete catalogue of the commercial uses for paper bags. Bowaters know quite a number of them since they produce millions of paper bags every year — bags of white papers, kraft papers, greaseproof, glassine and cellulose film, waxed and laminated, plain or printed. They know, from experience, that many branches of industry and commerce have found in the many developments of the once-humble paper bag, simple, economical methods of packaging for small but important items which have hitherto been packaged inadequately or not at all.

You tell us

What Bowaters do not know—for certain—is to what extent the use of bags can be extended in your particular field. Maybe in your particular business, you could use, to advantage, the high sales-appeal of transparent film bags or the grease and moisture resistance of glassine and glassine laminated bags. Or, perhaps you're making a hygroscopic powder that demands the protection from Water Vapour Permeability that waxed bags offer.

It is a safe assumption that, whatever your particular interest, there are undiscovered uses for one or other of the forms of paper bag now available.

In this spirit of challenge, Bowaters will welcome your enquiries on any aspect of packaging by bag. Come and talk it over with the man on the spot.

Wax works in colour

DRESS YOUR GOODS up in their finest of clothes . . . and what better than wax wrappings to do a big selling job for your product wherever it appears?

Believe it or not, some people still think Bowaters print *on* waxed paper. They don't. They print on the base paper which is then passed through the waxing bath. That operation can't be shown on the stand but what you will see are specimens of multi-coloured printing by the gravure, letterpress and aniline processes on waxed wrappers that Bowaters are supplying to some of their customers.

Colourfully printed wax wrappers take some beating for sales-appeal. The smooth wax coating adds its own glossy lustre to the rich tones and mouth-watering realism of first-class printing. And you know, of course, that wax protects, keeps in freshness and flavour and guards against contamination.

If you are interested in new applications in your industry for:

Multiwall Sacks, Fibre Drums, Corrugated Cases, Paper Bags, Protective Packaging Papers . . .

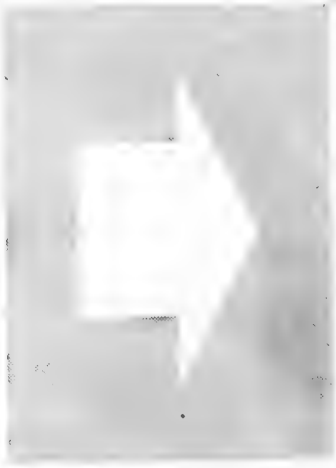
. . . come and see us at
Stand No. 8, Row S, *Empire Hall*
or write to **Divisional Sales Manager, Packaging Division, Bowater House, Stratton Street, London, W.1. GRO 4161**

I.C.I. DENDRITIC SALT

—a NEW fine grade for foodstuffs

I.C.I. Dendritic Salt is a fine vacuum salt with a new crystal shape. It is soft and floury, with the following distinctive qualities—which are of special advantage in many applications in the food and dairy industries :

- Outstanding non-caking properties
- High purity—99.6% sodium chloride
- Blends well with other finely-divided materials
- Low bulk density—ensuring good covering power
- Rapidly soluble in water



I.C.I. Dendritic Salt is of particular interest to users of Dairy or fine Crystal salt, since it not only offers technical advantages but is also cheaper.
Imperial Chemical Industries Ltd. are the sole manufacturers of Dendritic Salt, which is protected by patents in Great Britain and other countries throughout the world.

IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1

99.9% recovery of solids with—

BLAW KNOX

'Buflovak' Evaporators

You are certain to get back 999 lbs. from each 1000 lbs. of recoverable materials fed to "BUFLOVAK" Evaporators. That rate of recovery is constantly achieved in actual operation.

"BUFLOVAK" Stainless Steel Food Product Evaporators set new standards in profitable production of highest quality concentrated food products with natural flavour, good colour, smooth uniform texture, and good body. They are manufactured in types and capacities to meet all requirements and their efficient operation is maintained with minimum supervision, whilst cleaning and sterilizing are easy, thorough and positive.

Right: BLAW KNOX Stainless Steel Double Effect EVAPORATOR INSTALLATION for food products.

Above: Upper chamber and heating tubes, showing complete accessibility for cleaning when the hinged cover is swung open.

LET'S TALK IT OVER

Why not discuss your processing problems with Blaw Knox Chemical Engineers? They will be pleased to confer with you.

EVAPORATORS · DRYERS (ATMOSPHERIC AND VACUUM)
PROCESSING KETTLES · FLAKERS · CONDENSERS
SPECIAL PROCESSING EQUIPMENT

BLAW KNOX

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Reduce your Bug Count ★

★ Textile core covered with white smooth flexible plastic

★ Wears smooth not 'woolly'.

★ Can be cleaned in a flash.

★ Highly resistant to oils, fats, greases, acids and alkalis.

★ Odourless and tasteless.

Supplied in any number of plies up to 60".

ANOTHER RIL PRODUCT

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FOOD BELTING

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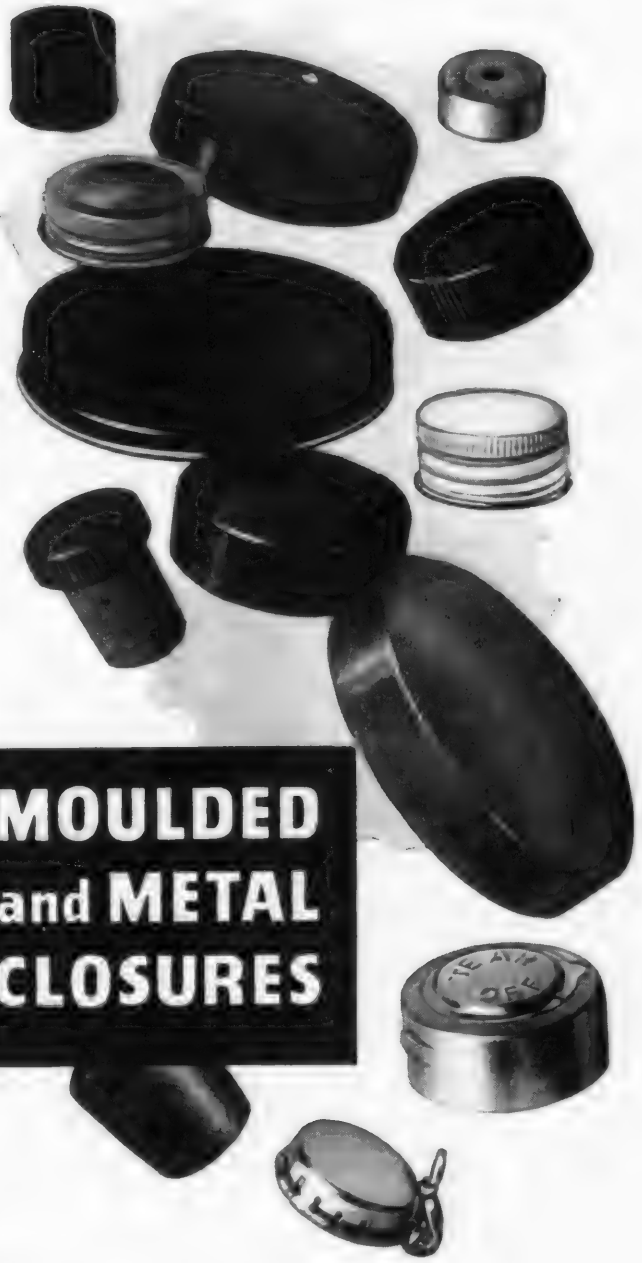
Let's go selling with



MOULDED and METAL CLOSURES

AN efficient closure can also be attractive and vital in the sales appeal of the whole package.

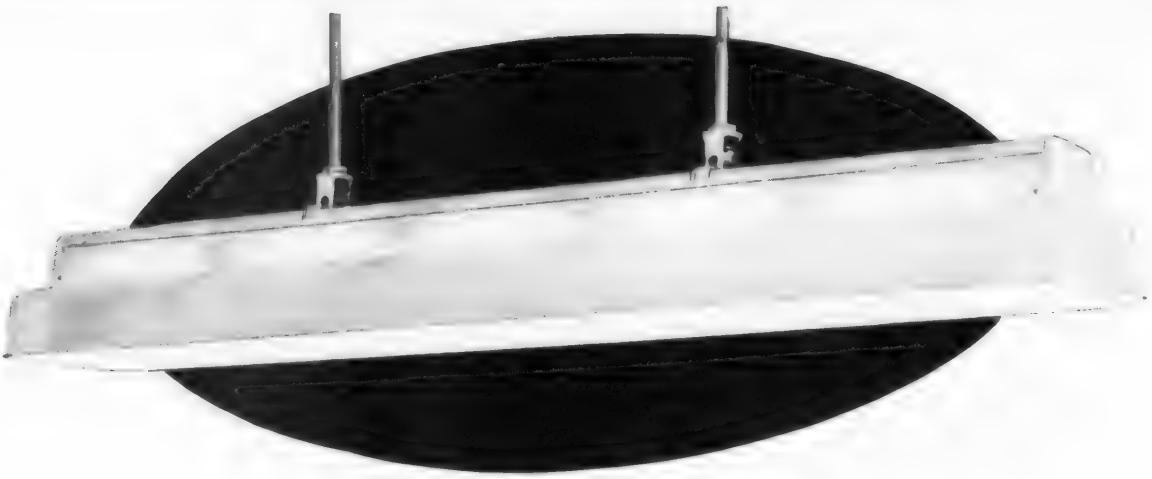
We can design and supply plain, fully decorated tin-plate or aluminium closures, cork stoppers and plastic caps from black to the most delicate pastel shade, with exquisite embossing.

When the contents of the container have been used and the label washed off, a distinctive closure will go on telling your story.

UGB
CLOSURE DIVISION

UNITED GLASS BOTTLE MANUFACTURERS LTD

8 LEICESTER STREET, W.C.2. *Telephone:* GERRARD 8611 (18 LINES) *Telegrams:* UNGLABOMAN, LESQUARE, LONDON



You'll be glad it's

There is a wide range of specially designed G.E.C. fluorescent fittings for every trade and industry. Simple to fit. Snap-action dismantling for quick, easy one-man maintenance. Consult your local contractor for best type of G.E.C. fitting . . . with of course Osram tubes.

G.E.C.

● *The General Electric Co Ltd, Magnet House, Kingsway, London WC2*

The case for better packaging

WE SHALL BE PLEASED to discuss the many aspects of planned packaging and, in doing so, to meet old friends and make new ones.

MEDWAY
THE CASE FOR BETTER PACKAGING

THE MEDWAY CORRUGATED PAPER CO. LTD., NEWHYTHE, MAIDSTONE, KENT

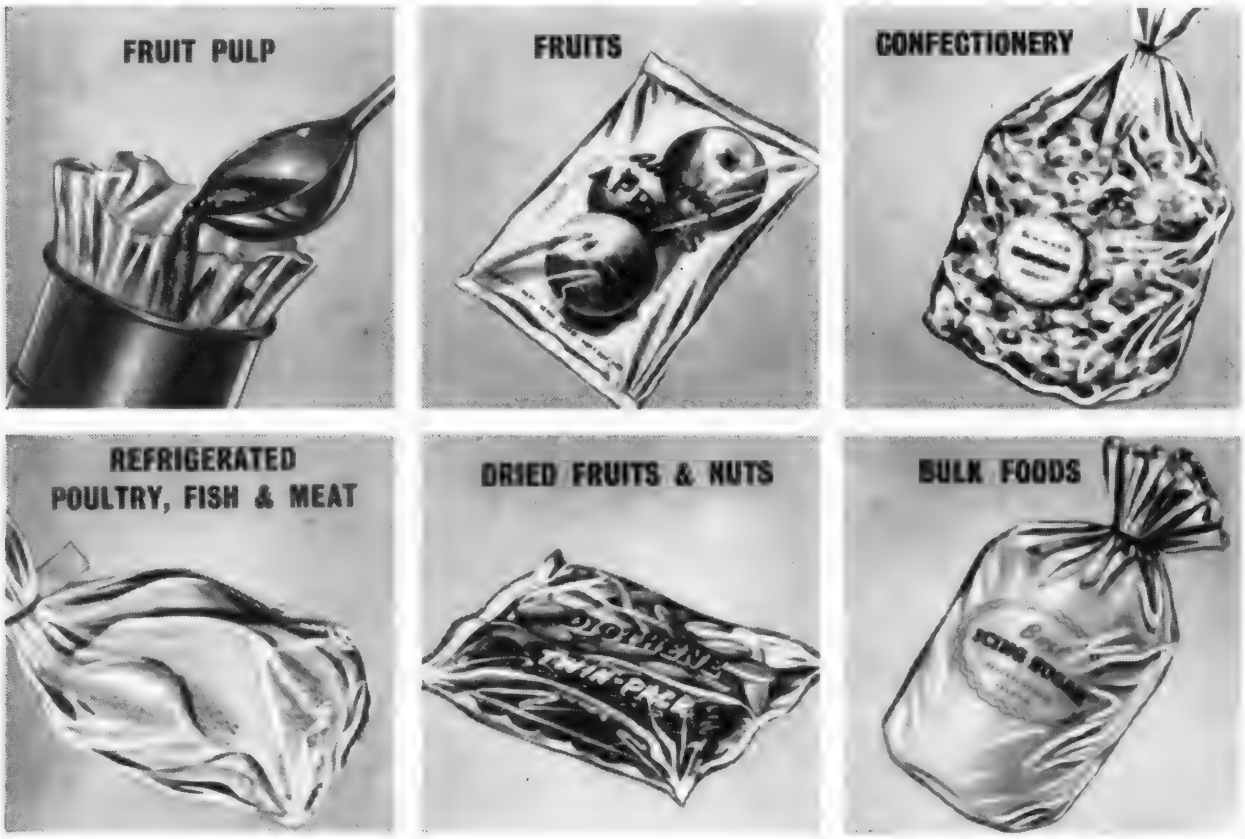
London Sales Office: Blackfriars House, New Bridge Street, London, E.C.4

DIVISION OF THE Reed PAPER GROUP

WE ARE EXHIBITING AT THE
Packaging Exhibition
By Provincial Exhibitions Ltd
18-28 Jan. '55
National & Empire Halls
OLYMPIA
London

STAND Nº 6H & 6J

Could Diothene be used
(Polythene)
for your product?



TRANSPARENT . . . for eye and appetite appeal . . .
TOUGH for protection . . . completely HYGIENIC

Diothene is a new, transparent flexible film with outstanding qualities for the packaging of food either in bulk or in packs for the counter. It is tough—does not easily tear or puncture: it is transparent—shows the contents attractively; it is sterile—has no odour, is non-toxic and cannot taint the contents. Diothene is moisture-proof, liquid and sift proof, can be sealed easily and is unaffected in deep-freeze storage. Diothene can be supplied in quite small bags suitable for counter sales or in heavy gauge bags suitable for large quantities.

Flexible Packaging Ltd at their factory at Portsmouth, manufacture the Diothene film, make up bags to exact specifications in any quantities and print in multi-colour—all under one roof.

This service assures prompt deliveries and competitive prices. And because Flexible Packaging Ltd are now a subsidiary of The Metal Box Company, users of Diothene can take advantage of Metal Box design and research facilities—the most extensive in the country covering packaging requirements.

MB DIOTHENE (POLYTHENE)

DIOTHENE WILL KEEP IT CLEAN

THE METAL BOX COMPANY LIMITED

Flexible Packaging Division

THE LANGHAM • PORTLAND PLACE • LONDON • W.1 TEL: LANGHAM 2040

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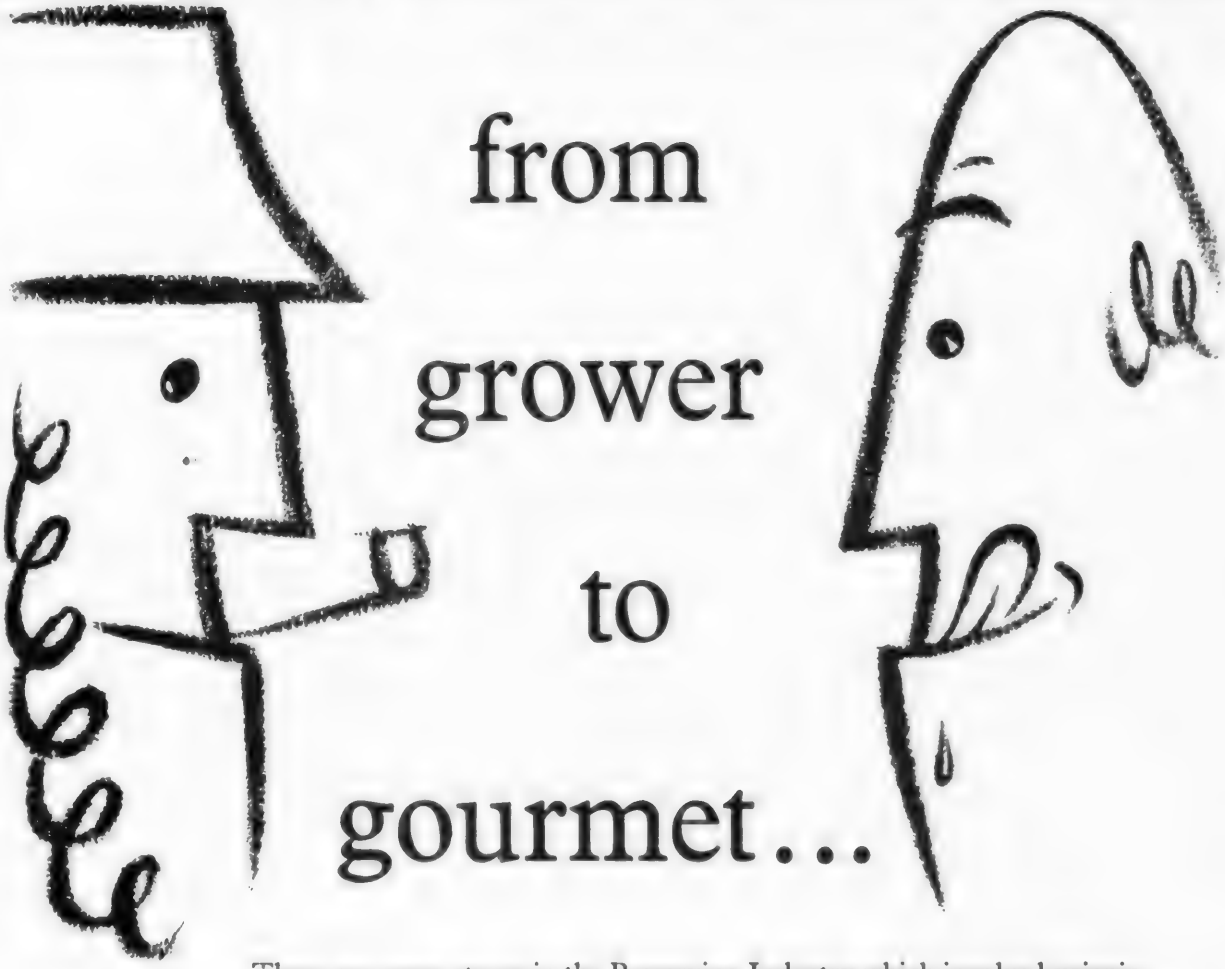

There are many stages in the Preserving Industry which involve hygienic handling. Braby aluminium trays are specially designed for this purpose; light to handle and stacked with safety, they are of one-piece seamless construction with rounded edges for rapid cleansing and sterilisation.

Braby non-corrosive aluminium trays are supplied with or without ventilating louvres in two sizes 20" × 15" × 6" deep, capacity 1,660 cubic inches and 18" × 13" × 5" deep, capacity 1,000 cubic inches.
Braby trays are also used for Meat, Fish, Confectionery and other foods.
We welcome your enquiries.

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Eclipse Works, Petershill, **Glasgow**, N. TEL: Springburn 5151 Also **Falkirk**
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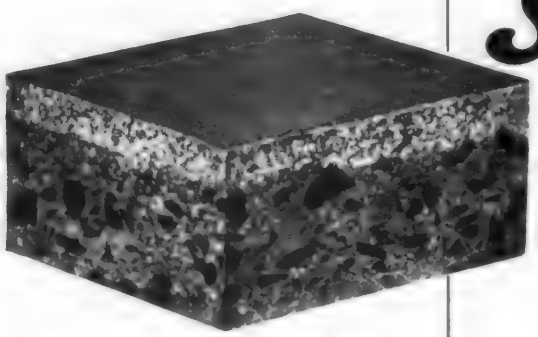
"You'll find there's nothing so tough as a Stelcon Floor"



Section of a Stelcon Steel Clad Flag which shows clearly its great density.

Stelcon

Stelcon Floors are tough and hardwearing. They'll stand up to the severest tests and take the heaviest traffic year after year. That's why so many users of modern mechanical handling equipment are plumping for Stelcon Floors.

You'll find Stelcon Floors in every industry — in every country.

STELCON (INDUSTRIAL FLOORS) LTD., CLIFFORDS INN, LONDON, E.C.4. TELEPHONE: CHAncery 9541

Increase Your Handling Efficiency

Crumpets being cooled on "Wedco" Woven Wire Belt Conveyor.

"Wedco" Woven Wire Belts, Conveyors, Elevators and Lowerators, are designed and manufactured to meet the requirements of all industries and, when used either individually or combined to the best advantage, they will considerably increase handling efficiency and play an important part in reducing costs. The Woven Wire Belts provide a flexibility in handling that is not equalled by any other handling medium. They are supplied in a wide range of materials including stainless steel and, as they are easily cleaned by water or by steam, they are absolutely hygienic. They will operate efficiently in damp or wet conditions and in widely varying temperatures. Their extremely long life and low initial cost make them a most economical proposition. May we send you our latest Catalogue which is a mine of information.

Wedco

THE BRITISH WEDGE WIRE CO. LTD.

RICHMOND MACHINE WORKS, WARRINGTON

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TECHNICAL REPRESENTATIVES IN ALL PARTS OF THE BRITISH ISLES

GREAT-GRANDFATHER SPEAKS HIS MIND

"If I wanted quicker morning starts, m'boy, this is what I'd do"

Whatever else might be said about Great-Grandfather's influence in industry, it couldn't be said that the old gent ever let the grass grow under his feet.

PROCEEDING, GREAT-GRANDFATHER SAID:

"This is your problem: you want more output a day, and you could get more output if the process machines at the far end of the steam system could be got into production quicker in a morning.

"You want to shorten the time between turning on steam at the boilers and getting your machines up to temperature.

"Now, m'boy, first things first.

"These Spirax people say that if the air can be got out of the steam mains quicker, the heat can be got round the system quicker. You *think* it might be a fairy story, but what have you done about it?

"This is what I would do; I would ask these people to show me just how this automatic air venting might help *me* to get more output from *my* plant, then I'd give it a trial.

"I wouldn't think twice about it, m'boy; I'd put it to the test."

SPIRAX-SARCO STEAM CONTROL

SPIRAX-SARCO LTD., CHELTENHAM, Glos. *Phone: Cheltenham 5175-76. Grams: Spirax, Cheltenham*

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REQUEST SLIP FOR FURTHER INFORMATION

To
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CHELTENHAM, Glos.

Please send details of automatic air venting of steam mains for quicker morning starts.

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FM 155

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For single or three phase supply

BROOK MOTORS Ltd

AUTOMATIC DIRECT SWITCHING STARTER for motors up to 5 h.p.

ONLY ONE MOVING PART • COMPACT SIZE
EASY TO FIX • COMPLIES WITH B.S.S. No. 587
ALTERNATIVE FLUSH MOUNTING AVAILABLE

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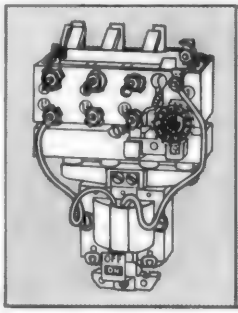
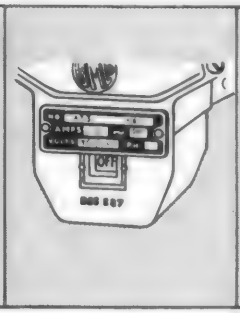
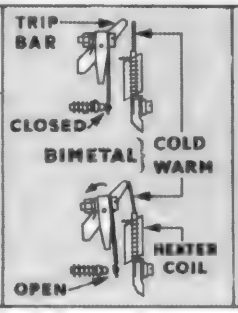
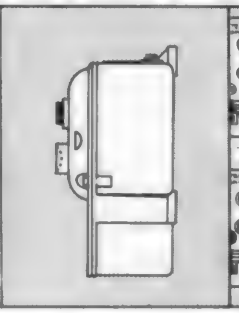
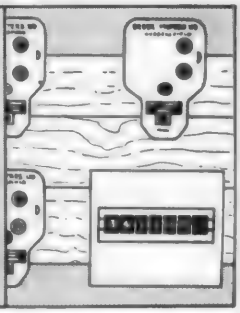
				
Moulded plastic panel with minimum number of parts.	Visible ON — OFF indicator for extra safety	Self-resetting overloads. Interchangeable heater coils for various h.p. ratings.	Shrouded 'START' button prevents accidental operation. Projecting 'STOP' button for speedy emergency operation.	All BROOK starters are tested for long life. One starter did nearly 5,000,000 operations!

BROOK MOTORS LIMITED
HUDDERSFIELD

55/4

This modern battery of high speed Broadbent Centrifugals in Australia processes a large output of superior quality white sugar.

FOOD RAPIDLY AND HYGIENICALLY PROCESSED THE BROADBENT WAY

To process modern foods economically, effectively and with maximum output, insist on installing BROADBENT HIGH-SPEED CENTRIFUGALS. The extensive range covers numerous applications and the prepared food retains its original flavour and purity as suitable corrosion resisting materials are used.

THOMAS BROADBENT & SONS LIMITED

A sturdy vehicle of unequalled value, the result of long years of specialised truck building experience.

COMMER

'SUPERPOISE' 3-4 TONNER

SALIENT FEATURES

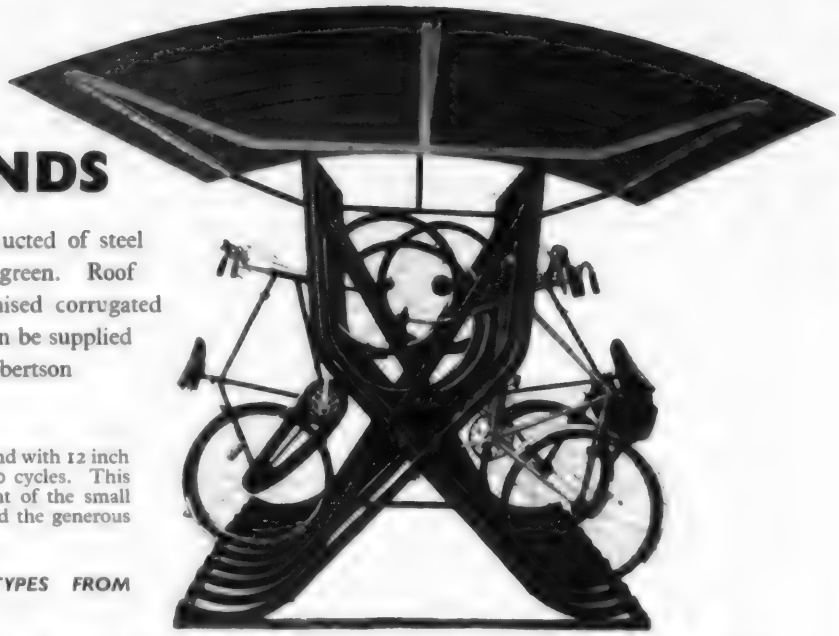
★ Choice of 85 b.h.p. petrol or 83 b.h.p. diesel power units—the former available with porous chrome bores as an optional extra. ★ Robust four-speed synchromesh gearbox. ★ Fully-floating spiral bevel rear axle. ★ Powerful servo-assisted hydraulic brakes, two-leading-shoe type. ★ Distortion of cab prevented by patented 'Diaflex' mounting.

A PRODUCT OF THE ROOTES GROUP

COMMER CARS LTD. LUTON BEDS. EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

ABIX

CYCLE STANDS



ABIX Cycle Stands are constructed of steel throughout, stove-enamelled green. Roof sheeting is normally of galvanised corrugated sheets. If required, sheeting can be supplied in Aluminium, Asbestos or Robertson Protected Metal.

The illustration is of our Type B stand with 12 inch centres, 10 feet long, capacity of 20 cycles. This type of stand is popular on account of the small amount of ground space covered and the generous roof cover.

- *THERE ARE 26 DIFFERENT TYPES FROM WHICH TO CHOOSE*

A QUARTER OF A CENTURY'S EXPERIENCE IN CYCLE STAND MANUFACTURE

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ABIX (METAL INDUSTRIES) LTD., *FACTORY EQUIPMENT SPECIALISTS*
TAYBRIDGE HOUSE, TAYBRIDGE ROAD, BATTERSEA, LONDON, S.W.11
Phone: BATTERSEA 8566/7 Grams: ABIX, BATT, LONDON

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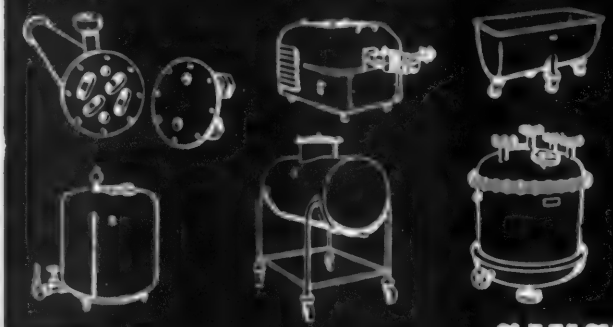
. . . is just the job for GIUSTI

Giusti make anything in stainless steel—from small trays to complete process plants. Our engineers have undertaken jobs for the varied and exacting needs of the Chemical, Pharmaceutical, Food, Confectionery and many other industries. Make this know-how and experience work for *you*! Just call or write for a competitive quotation.



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Sole U.K. distributors for: Westfalia separators, clarifiers, mixers.

T. Giusti & Son Ltd., Belle Isle Works, 210, York Way, London, N.7. Tel: NORth 5021

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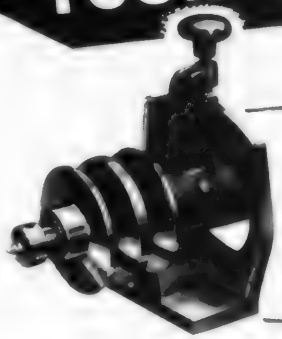
Superior in Design—Proven in Performance

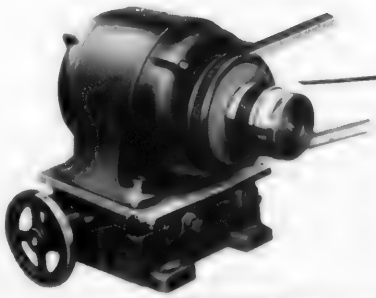
From small laboratory machines suitable for production control and quality control to the largest industrial units

Crofts .. STOCK ANSWERS TO YOUR VARIABLE SPEED PROBLEMS



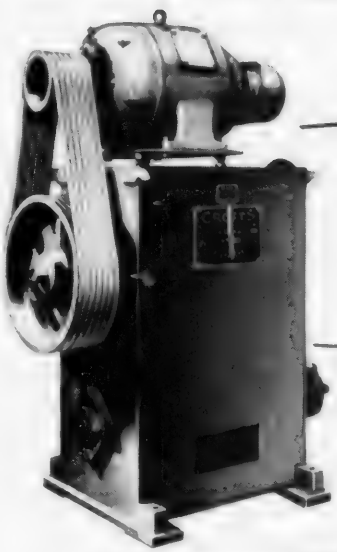
C.JR. VARY SPEED CONTROLS

Simple small power speed control, efficient, compact and suitable for any mounting position.
Powers up to 10 h.p. Ratios up to 8 - 1.
Publication 453/14



VARIABLE SPEED PULLEYS

Any standard motor can be converted to an infinitely variable speed drive. Speed changes gradual, smooth and silent.
Powers up to 80 h.p. Ratios up to 15 - 1.
Publication 353/14



VARIABLE SPEED GEARS

Horizontal or Vertical units with or without motor mounting. Efficient, infinitely variable speed. Local or remote control.
Powers up to 150 h.p. Ratios up to 16 - 1.
Publication 253/14

Crofts complete power transmission service also includes

COUPLINGS, CLUTCHES, WORM REDUCTION GEARS, GEARED MOTORS, MACHINE CUT GEARS, CASTINGS IN IRON AND STEEL, PULLEYS AND PLUMMER BLOCKS.

Many items from stock. Publication S.652/14

Crofts (ENGINEERS) LIMITED. BRADFORD 3. ENGLAND

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STEP UP YOUR OUTPUT!

SEE OUR LATEST

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TEA FLOUR CEREALS CONFECTIONERY

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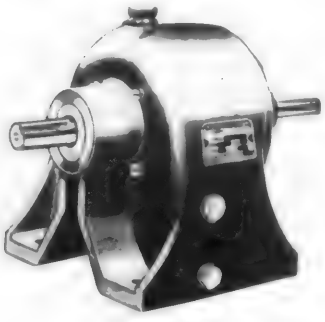

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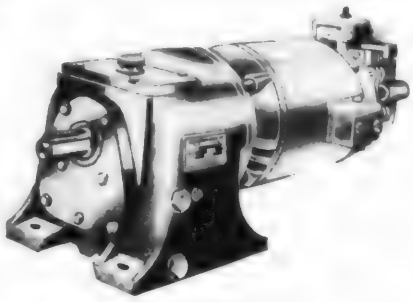

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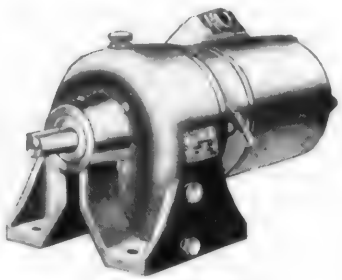

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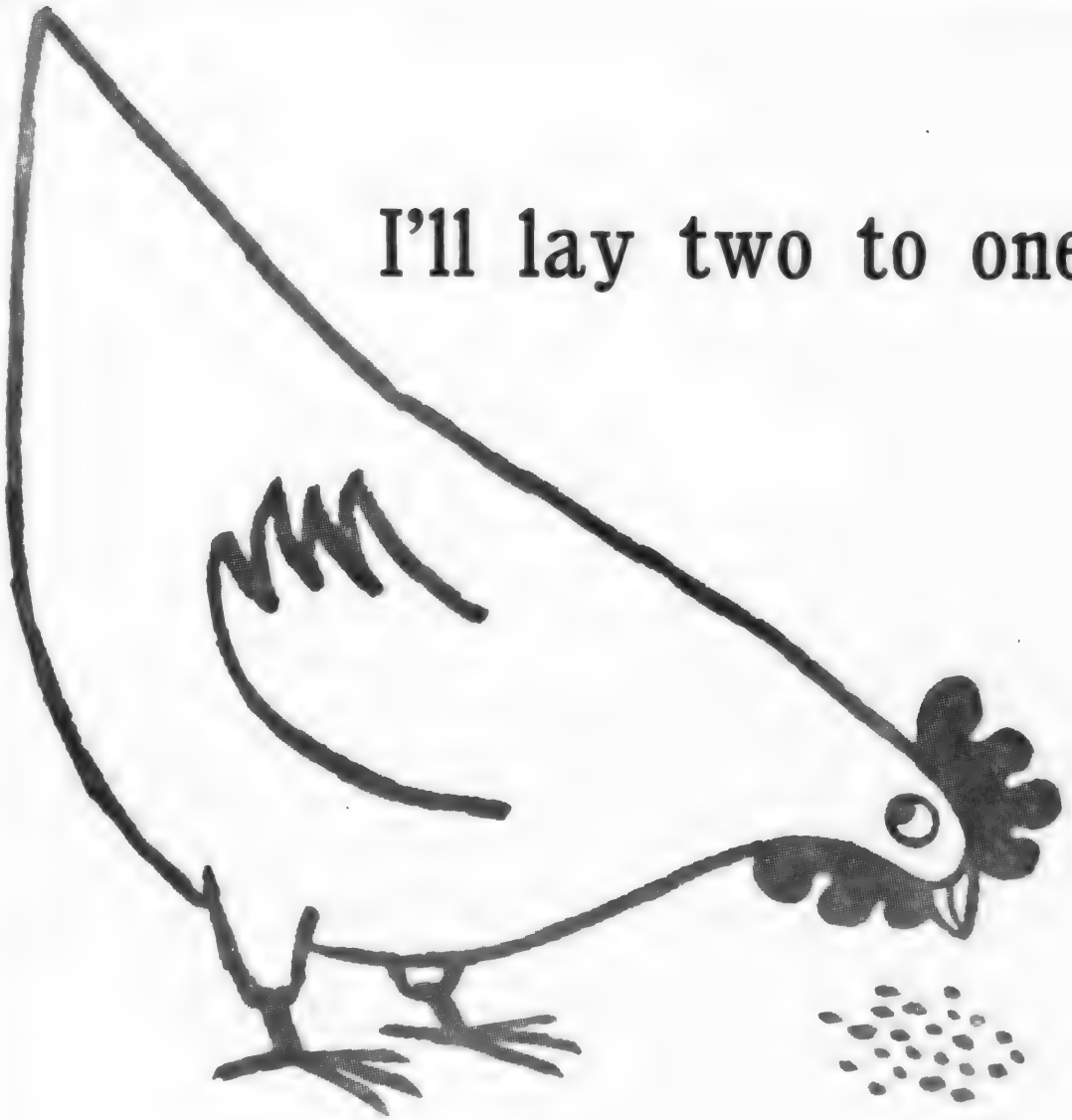

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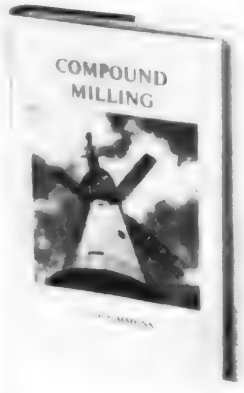

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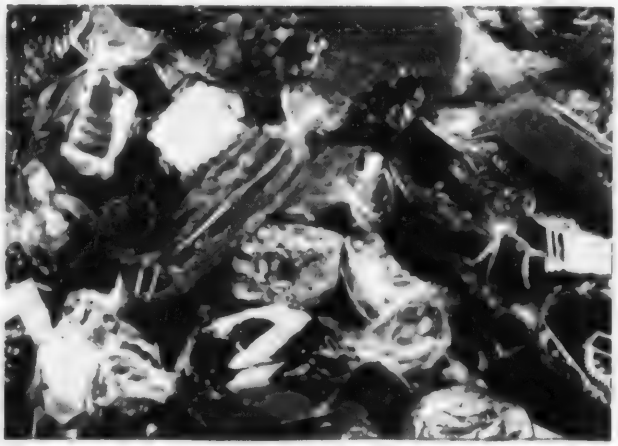

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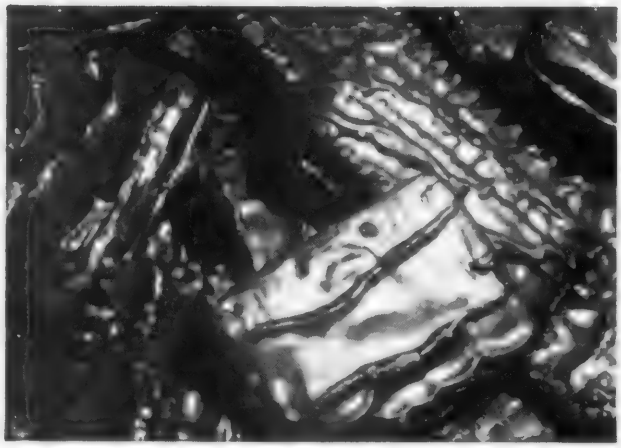

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FOOD MANUFACTURE

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FOOD MANUFACTURE

Vol. XXX, No. 1 January 1, 1955

Food preservation with antibiotics

CONSIDERABLE progress has been made in the use of antibiotics for food preservation since we published a note on the subject in these columns last February.

The advances have been made not in the United States, the world's biggest producers of antibiotics, but in Britain. Indeed, according to information sent us by Mr. H. B. Hawley, director of research of Aplin and Barrett Ltd., it seems that we are well ahead of the U.S. in the application of antibiotics to food. Already Aplin and Barrett have successfully treated almost 1,000 tons of processed cheese with the antibiotic, nisin.

Nisin is produced by certain strains of the common cheese starter organism *Streptococcus lactis*, and it has been found to be particularly effective against clostridia. It is claimed that the blowing of processed cheese by clostridia, and other forms of clostridial deterioration are completely controlled by the use of this inhibitory substance which is itself quite harmless.

It has also been used successfully in France, and in Holland, for the prevention of defects due to clostridia in Gruyère, Emmental, Edam and Gouda types of cheese. It has other potential uses in canned vegetables and processed meat packs, but these have not yet been exploited commercially because supplies of a suitable nisin preparation are not yet available in quantity. Suitable nisin preparations for use in cheese are now available in substantial commercial quantities, and are being used extensively in this country. An export business is also being developed, European, Canadian and American firms being among the customers.

In contrast to many other developments, the development and exploitation of this new inhibitory substance has been so far confined to this country. The production of nisin preparations and their use in foodstuffs is the subject of U.K. and overseas patent applications controlled by Aplin and Barrett, and also by the National Research Development Corporation with whom the company have a manufacturing agreement.

Snap frozen prawns

AUSTRALIANS are developing quite a taste for prawns and, in view of the huge distances in that country, the task of getting this delicacy to market sets some problems. The answer is "snap freezing." Frozen prawns and fish have been successfully transported by refrigerated road transport from the Richmond River Fishermen's Co-operative fish freezing works at Ballina, New South Wales, to Melbourne, a distance of 1,090 miles. The prawns are snap frozen in 4 lb. blocks and seven blocks go to a carton. The snap freezing machine is of English make and is the first Jackstone plate freezer to operate in Australia on fish and prawns. This machine produces a pack identical with imported English fillets. An Australian-wide organisation, Frigmobile Pty., Ltd., arranged for a refrigerated road truck to carry the product to Sydney and on to Melbourne. The truck, which has its own refrigerating equipment, carried a gross load of 12 tons, and held the product at 0°F.

Up to the present the Co-operative company has frozen cooked prawns, cooked king prawns, king prawn cutlets, uncooked garfish fillets, skinned and boned black bream fillets, and boned sea mullet fillets. When the processed products are thawed, it is impossible to tell them from fresh, and the flavour is retained completely.

Column steriliser

THE HYDROSTATIC pressure of long columns of water is used to raise steam to a temperature high enough to sterilise milk and canned foods in an ingenious apparatus of French design known as the "Carvallo" steriliser. Its basic simplicity and economy in use makes it an attractive proposition and it is arousing considerable interest.

The steriliser consists essentially of a U-tube 20 or 30 ft. high which is filled with water and heated at the bottom; the water there vaporises into steam which, under the hydrostatic pressure of the water in the columns, attains a temperature high enough for sterilising foods. One British canner has already installed a cooker of this type, the cans being passed

through the U-tube in the baskets of a chain conveyor.

A further application of the equipment was shown at the recent International Dairy Equipment Exhibition in Paris. This was for sterilising milk in bottles. Milk bottles lying in perforated tubes move through the column of water under hydrostatic pressure, the temperature increasing gradually from 80° to 100°C., and then through a column of steam under pressure in which the temperature is kept constant at 115°C. After being held there for 18 min., the bottles pass through two more columns of water under pressure; in these they are cooled and super-cooled from 100°C. to 20°C. Use is made of the fact that the cooling water pumped in at the top of the super-cooler takes up heat from the bottles leaving the steam column; this water is then circulated through the preheating column where the cold bottles are preheated in preparation for entering the steam column. This results in a great saving of steam and water.

The system is obviously suitable only for the larger dairies and food factories, but has economy to commend it together with the advantage of being a continuous process. The manufacturers are the firm of Frederic Fouché.

Electric fishing

A NEW electric fishing line which knocks fish out as it catches them is reported by the Food and Agriculture Organisation. Developed in Germany, this sea fishing device stuns the catch with a 200-volt shock.

In the latest issue of its *World Fisheries Abstracts*, FAO also summarises a recent report on Hungarian experiments in catching fish with electricity in fresh waters in which plants, reeds and snags prevent use of traditional fishing methods. Electrodes at a potential of 300 volts lowered into the water by the Hungarian experimenters have attracted fish from up to 6 ft. and stunned them so that it has been possible to scoop them out of the water with a hand net. Small fish, it was discovered, were less attracted to the charged electrode than larger fish but even if they did chance to be stunned could be left in the water to recover. One Hungarian boat took 5½ tons of fish in 6 weeks from waters which could not be fished by traditional means. Use of the method is to be encouraged in appropriate waters and it is also to be used to rid rivers and ponds of predatory species and to catch fish for pond breeding.

FAO consider electrical fishing, particularly in salt water, to be still at an experimental stage. Nowhere in the world, as far as FAO is aware, does electrical fishing give any immediate promise of commercially competing with traditional methods.

Whiskey v. whisky

IRISH whiskey has been fighting a losing battle for the last 50 years against blended Scotch whisky which today, owing to the great change in world taste, commands the market. Irish distillers, however, are now increasing the manufacture of grain whiskey which, combined with the traditional Pot Still, will, it is hoped, produce a blended whiskey that will re-establish the popularity of the Irish product. Today the export of Irish whiskey from the Republic is less than 1% of Scottish exports in contrast with the Irish exports of whiskey in 1904 of some 8½ million gallons, the major part of all the whiskey consumed in, or exported from, the U.K.

The failure of Irish whiskey was due solely to the revolutionary change in world taste. Up to 90 years ago, the only whiskey available in Ireland or Scotland was straight Pot Still. In 1861, an Irishman named Coffey invented a new process of distilling whiskey which produced a cleaner and more wholesome spirit by disposing of fusel oil and other deleterious oils. Experts soon discovered that a blend of the two whiskies (Pot Still and grain) produced a lighter and more pleasant drink. The blended product with expert handling and salesmanship almost displaced Pot Still or malt whisky. These expert blenders were Scottish and Northern Ireland merchants and actually a large percentage of whiskey shipped from Ireland at the beginning of this century was blended, the bulk of it being exported through Belfast. Ireland then had ten grain distilleries, two of them in Southern Ireland. Of the Northern Ireland producers' output, 5,500,000 gal. (90% of which was blended whiskey) was shipped from Belfast in 1904. Later, however, Irish distillers and blenders sold their interests to a Scottish combine and the Irish businesses were closed.

Ireland's particular aim at present is to try to regain her whiskey markets in America where today 95% of all the whisky consumed is blended whisky, the remainder, about 5%, being American Straight whisky, produced in a pot still. These figures give some indication of how greatly world taste has changed since blended whisky was introduced. Modern taste, apparently, requires a light blended whisky which is easily digested.

It has been suggested that another distillery should be opened in the Republic for the production of grain whiskey. Already there are two grain distilleries in Ireland as against five pot still distilleries. In Scotland there are ten grain distilleries as against over 100 malt distilleries. With Government support and co-operation from the Irish trade, the distillers in the Republic are convinced that there is a bright future for Irish blended whiskey and Pot Still.

Can corrosion

CORROSION of cans by their contents has received practically no attention from scientists outside the canning industry, yet the phenomena involved are complicated and to a large extent unexplained. In the canning of fruits and vegetables alone there are many special problems.

Plain tinplate cans are normally used for packing unpigmented fruits such as gooseberries, yellow plums, gages, peaches, pears, apricots and pineapples, and vegetables such as potatoes, beans in tomato sauce, parsnips, celery, asparagus and a variety of soups. The normal shelf life of such products is over three years and losses are rare, although thirty years ago this was not the case and corrosion losses in canned fruits resulting from actual perforations being formed were not unknown. The comparative rarity of this event today points to considerable improvement having been brought about in the manufacture of steel bases, tinplate and cans, and in the canning process itself and, with few exceptions, the tin that does dissolve from the can into the food rarely approaches the safe limit of concentration of 250 p.p.m. Asparagus and rhubarb are exceptions, having some natural constituent which attacks tin vigorously, and although this can be prevented by lacquering the cans internally it has been found that the canned product is then inferior to the same material packed in a plain can. In short, the tin dissolved actually improves the organoleptic properties of the food.

A review of this subject of corrosion of tinplate by foods packed in cans is being published in the January and February numbers of CORROSION TECHNOLOGY, our associate journal in the Leonard Hill Technical Group. Written by Dr. Denis Dickinson of the Fruit and Vegetable Canning and Quick Freezing Association, Chipping Campden, the two articles provide a first-rate summary of the present state of knowledge of the subject. The author covers his subject right from the methods of can manufacture to the importance of vacuum and the effects of accidental introduction of trace elements in the form of spray residues.

Stable ferment process

A PROCESS that makes possible the production of yeast doughs on a more efficient basis, compared with the sponge method, was reported at the annual meeting of the American Dry Milk Institute in Chicago.

Known as the ADMI stable ferment process, it is a homogeneous mixture containing water, yeast, yeast food, malt, salt, sugar, and non-fat dry milk solids. The ferment and resulting doughs contain only natural fermentation products and no chemical additives are necessary.

A specific amount of water is put into a tank equipped to keep the ferment under agitation, the dispersal of the remaining ingredients of the ferment being achieved by mechanical means in a matter of a few minutes.

The ferment is held under agitation at a predetermined constant temperature for a specified time until properly conditioned for use. At the end of this period, the mixture is cooled, the ferment remaining stable for several hours.

The use of this process, for which no extensive equipment is necessary, eliminates the sponge operation.

Antiscorbutics

To the history of lime juice and lemon juice as antiscorbutics two important chapters were added just a century ago. The Merchant Shipping Act of 1854 postulated that antiscorbutic commodities must be included in all ships' stores whenever a voyage was to last longer than ten days. The second fillip given to the fight against scurvy came in December, 1854, when on the advice of a Dr. Andrew Smith some 20,000 lb. of lime juice were sent to the Balaclava base, following reports of much scurvy among British forces in the Crimea.

This store of lime juice was never used during that blackest page in our military history, when only a Florence Nightingale could bring a scientific viewpoint to nursing or an Alexis Soyer could substitute nourishing diets for the vilest food served to an army. And yet that very bungling which failed to issue lime juice to our forces suffering great losses from disease proved in the end a powerful spur to the cause, to fighting scurvy in land expeditions as well as at sea. Lord Raglan had noted how French troops were in far better health; hence his SOS for antiscorbutic acid. But what he had failed to note was the manner in which the French used all available vegetable supplies near their bases.

The relative merits of lime juice and lemon juice proved an interesting subject long before the discovery of ascorbic acid brought something definite to the argument. British sailors were called "limeys" when in American ports, because of a preference sponsored by the Board of Trade, which naturally preferred lime juice from our West Indian colonies to lemon juice purchased from the Mediterranean littoral. For long the two were regarded as equal in effect, and only in recent years was an ounce of lemon juice with its average content of 10 mg. ascorbic acid proved twice as potent as an ounce of lime juice.

Yet this superiority might well have been noted even in the 1800's. Ross on the North-West Passage expedition had issued preserved lemon juice to his men; but so often such juice deteriorated because of insufficient sterilisation before bottling—except in H.M. ships where the custom was to add 25 per cent. rum to preserve the juice! During this period there persisted a belief that citric acid was the antiscorbutic agent, an acid replacing the old "elixir of vitriol." In the 1850's the Admiralty caused fresh lemons to be pressed in the Deptford naval depot and tried two ways of preserving the juice: by the addition of 10 per cent. brandy and by heat sterilising the stock before bottling with a layer of olive oil to exclude air. It may be guessed which method our sailors preferred!

The voyage of H.M.S. *Investigator* (an appropriate name, or so it turned out) lasted two years and three months, during which time not a single case of scurvy was reported. Still the lesson was slow to be learned, and it was not until 60 years ago that a second Merchant Shipping Act specified citrus juices alone as antiscorbutics on voyages.

India plans a bigger sugar industry

A MAJOR expansion of the sugar industry in India is now under way. Under the Indian Industries (Development and Regulation) Act of 1951, licences must be obtained from the government for the establishment of new undertakings or the substantial expansion of existing undertakings. Information on the issue of licences was recently given in the Indian parliament and this reveals that since 1953 licences have been issued for increasing the capacity of the sugar cane crushing industry by 8,400 tons/day. There are 14 projects in all ranging from one with a capacity of less than 100 tons/day to seven with capacities of between 800 and 1,000 tons/day.

In the case of three projects with a combined capacity of 900 tons/day the entire machinery has been ordered and the construction of the buildings is well advanced. Two plants accounting for 1,700 tons/day have ordered half of their machinery and another accounting for 800 tons has ordered 35% of its machinery. However, there has been no progress at all with the other eight projects.

According to the latest issue of the Statistical Yearbook of the United Nations, India's sugar production has declined in recent years. In the period since 1931 the peak year was 1939-40 when output totalled 1,415,500 metric tons. By 1949-50 this had fallen to 1,196,000 metric tons. Clearly, therefore, there is considerable room for improvement in output and the new projects, if and when they are completed, will contribute powerfully to this aim.

Food flashes

AT THE beginning of another New Year we turn back through the news items of late 1954 and wonder whether 1955 will provide such scintillating food flashes of the lighter kind. A farmer of Fukushima, Japan, we discover, plays a gramophone to his pigs while they eat, claiming that they gain weight twice as quickly that way. Nearer home the Music While You Work (or Eat) theme is continued by a Stratford farmer, who says he gets more milk from his contented cows by providing them with concertos as well as concentrates. A Norfolk poultry farmer is more specific, claiming that egg production has increased 10% since he let his hens listen to the B.B.C. "They do not mind what the programme is," he says, thus banishing any idea that Bach might produce more eggs than boogie.

Next to America, where such an increase in egg production would prove most welcome to a farmer's wife of Omaha. It seems that when her husband visits Washington she is accustomed to pay his return coach fare as far as Salt Lake City by sending eggs as payment to the U.S. Secretary of Agriculture. As late as 1952, the lady complains, only 2,504 eggs were required, whereas today the fare costs her 5,193 eggs.

This latest form of barter brings to mind one or two other variations on the urge to "swap" things, an urge which long ago drove us to exchange bullseyes for water-pistols and so on. But only in America does a full-scale extension of this theme work in practice. Only in America has an agricultural student paid part of his college fees by sending farm produce from home. The little pig that went to college rather than to market and sent back a diploma in rural economy in place of dollars certainly rivals many a swap in schoolboy fiction.

The original bwzampulist?

A RECENT Obiter Dicta item in FOOD MANUFACTURE recommended that the contents of beer bottles should not be used by collectors (bwzampulists) to remove the labels. This reminds us of a chance companion in a north country pub who not only did this but by rolling the label lightly inserted it into the the bottle and, using the remainder of the liquid, caused the label to unroll itself on the inside of the bottle. No reason is known for this performance. It transpired that he sold advertising space in a drapery journal and the story is told that one day he booked a very large contract from the head of an appropriate concern. The next day he appeared before this same V.I.P. but came this time to answer to a charge of some misdemeanour not unconnected with leaving insufficient liquid inside the bottle.

pH and Food Processing

By R. S. Evans, B.A.(Cantab.)

(W. G. Pye and Co., Ltd., Cambridge)

The pH meter is probably the most common of all laboratory instruments and its ubiquity testifies to the fundamental importance of this variable in scientific work. In recent years, however, there has been a growing appreciation of the part pH measurement can play in the factory and today there are many industrial installations for continuously measuring, recording and controlling pH. Against this background the author comprehensively reviews the applications of pH measurement in almost all branches of food manufacture. He commences with a description of modern instruments and then deals in turn with the various food industries.

INSTRUMENTS

PERHAPS the most important recent trend in *p*H measurement is the growing popularity of the direct-reading *p*H meter. Many potentiometer-type instruments have rendered yeoman service in research and development laboratories, but today *p*H measurement cannot be confined to such places. The process operator is vitally interested in possible *p*H changes, and managements have realised that tighter *p*H control can often mean considerable financial saving. In the laboratory it has been realised that modern direct-reading instruments combine accuracy with ease of operation.

The *p*H meters whose applications in the food industry will be described later fall into three classes, as follows:

Laboratory instruments

In this case, the requirement is for high accuracy, combined with simplicity of operation. The design must be such that this much-used instrument, which may be wanted at any time for research, analysis and product testing, will operate almost indefinitely with the minimum of service. As mentioned above, direct-reading meters are now becoming extremely popular because they give an immediate indication of the *p*H value of a sample and can be used to investigate *p*H changes with time, temperature, contamination, etc. Their use does not entail a complicated setting-up procedure by a highly skilled worker. A mains-operated type of instrument is illustrated in Fig. 1; it is also fitted with automatic temperature compensation. The myth that mains-operated instruments are fundamentally unreliable because of power supply variations has now been exploded; the better instruments are virtually unaffected by very large mains voltage and frequency changes and in actual fact are often much more stable than battery-operated instruments.

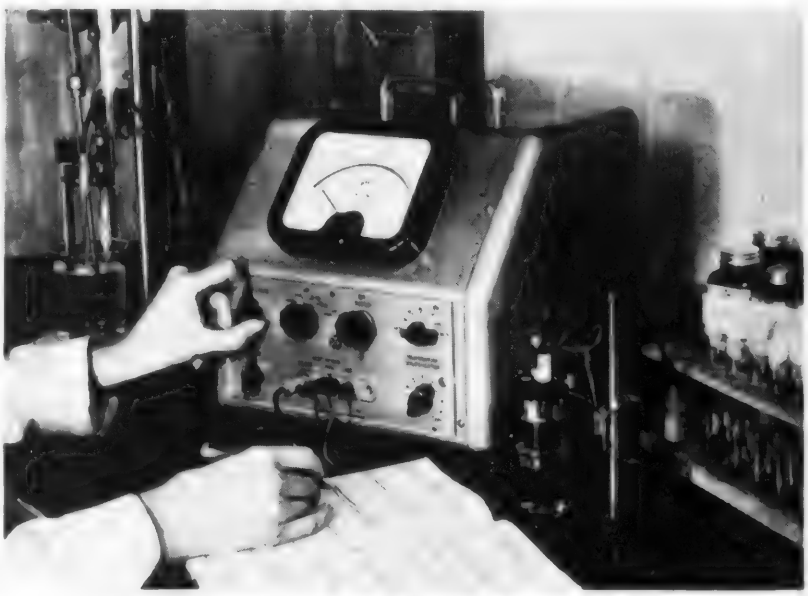

Fig. 1. Direct-reading mains-operated laboratory pH meter.

Many advances have also been made in the matter of electrodes. Glass electrodes are available which can be used over almost the entire range of 0-14 *p*H without the troublesome corrections previously necessary. The calomel reference electrodes require little maintenance and the standard electrode components can be used to measure volumes down to the order of drops.

The spear type glass electrode illustrated in Fig. 2 is used in many branches of the food industry, for tests on dairy products, meats, jams, etc. (see later).

Portable instruments

Here the requirements are reasonable accuracy, extreme portability, maximum reliability and an operating technique that makes possible its use by plant operatives. In some factories the instrument is based on the laboratory and in others it is used exclusively by works personnel. A typical instrument is illustrated in Fig. 3. Portability makes battery-operation essential. Direct-reading is perhaps even more essential

here than in the research laboratory. Any additional features, such as a simple method of checking the batteries under their working conditions and temperature compensation, are very well worth having.

The portable instrument must have robust and well protected electrodes; coverage of the complete *p*H range is essential since process liquors can often change considerably owing to breakdowns, etc., and possible damage to an electrode whose range is limited cannot be permitted.

Industrial instruments

These have to be permanently installed in the factory and continuously measure, record and control process *p*H values. The accent is on robustness, dependability, ease of maintenance and, of course, accuracy. The electronic unit (often known as a *p*H amplifier) has to be capable of quick replacement if necessary. In some applications an instrument of flameproof design is found to be essential. An example of one of these is shown in Fig. 4.

The electrode assemblies fall into two categories: immersion and continuous flow types. Reference to their use will be made later.

USES IN THE FOOD INDUSTRIES

The importance of *p*H measurement, recent discoveries, and advances in the application of new discoveries and improved instruments will be reviewed industry by industry. The last sections give short descriptions of the problems which are common to all branches of food manufacture, with a brief indication of the way in which *p*H instrumentation can assist in their solution.

Sugar processing

*p*H measurement and control is used at all stages in the manufacture of sugar and its products.

Raw sugar cane juice is clarified by the addition of lime. The raw juice contains many impurities in solution and in suspension and these must be removed. It is usual

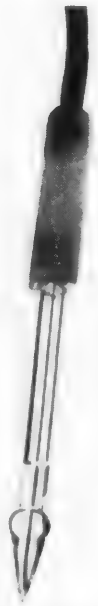

Fig. 2. Spear-type glass electrode, for measurements on semi-solids, etc.

at the same time to neutralise the acid (*p*H 5·5 approx.) juice to facilitate later processing and to avoid loss of sucrose as a consequence of hydrolysis at this stage. The soluble impurities (acids and salts) are precipitated by the lime in the form of calcium salts; this tends to bring down the suspended matter at the same time.

The need for accurate *p*H control of this problem has long been appreciated. It is only by such control that a pure product can be guaranteed and maximum economy attained. Under-liming means loss of sucrose; over-liming produces wasteful residual lime salts and highly coloured compounds. Both quality and quantity of sugar are therefore dependent upon accurate and reliable control. Liming is followed by filtration (also improved by efficient liming) and evaporation. The efficiency of the evaporators is materially reduced by over-liming, owing to deposition of lime compounds.

The problem is complicated by the fact that most of the settling is arranged to take place in a separate vessel from the liming tank, and each plant should be investigated with this in mind. It is also important that due attention be paid to the capacity of the liming tank in relation to the throughput rate. A typical layout is illustrated in Fig. 5. A sample of the limed juice output (normally about *p*H 7·5) to the clarifier is passed through a flow-type electrode assembly (e.g. in Fig. 6) before being returned to the tank. The output from the electrodes feeds a *p*H amplifier, which indicates the value on a meter. A recorder, alarm system, and remote indicators can be operated also, but the main function of the amplifier is to feed a controller which in turn adjusts the addition of the lime to the tank so as to hold the *p*H at the optimum value for the particular juice being processed. The lime is usually added in the form of a milk of lime slurry; excess water is to be avoided as it means additional evaporation time at a later stage.

The advantages of automatic control are obvious. The plant can operate continuously, irrespective of changes in the character of the juice; the plant worker can see the *p*H value at all times and the recorder charts form an accurate daily record of the operation of the process.

Among other phases of sugar refining employing *p*H control, perhaps carbonation and sulphitation are the most important. First carbonation usually takes place above *p*H 11, second carbonation at about *p*H 8, and sulphitation in the range *p*H 7·7-8·5.

Raw sugar is converted into a number of products of value to the food industry, such as invert sugar (liquid or solid) and caramel. The method of manufacture of caramel depends to a degree upon its ultimate use. For example, the caramel supplied to the foodstuff manufacturer differs from that supplied to the soft drinks industry and that for use in the manufacture of spirits, wine and cider. In all cases, accurate control is necessary and many firms specify a *p*H test before dispatch. A typical example of plant measurement is in the manufacture of foodstuff caramel, in which the invert sugar is treated with ammonia

Fig. 3. Direct-reading portable pH meter.

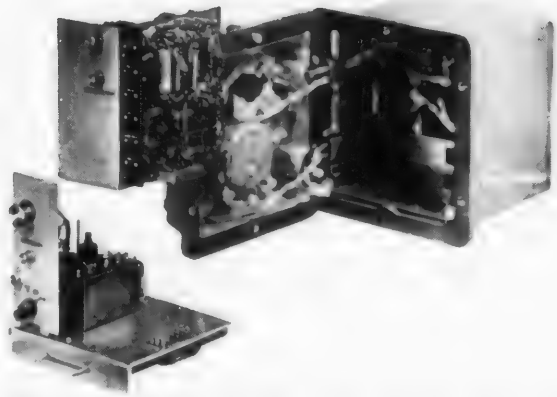

Fig. 4. Industrial pH amplifier, with electronic units removed.

and the mixture warmed. The *p*H steadily falls to a value of about *p*H 8 before the mixture is ready to be pumped to the next stage.

Fruit and vegetable processing, canning and preserves

Sourness in fruits is directly related to titratable acidity and therefore indirectly to *p*H, so that *p*H measurement is helpful in controlling flavour.

Adam[1] has shown that in the case of canned fruit, *p*H is important from two aspects. In the processing stage the *p*H value governs the chance of survival of spoilage micro-organisms, this chance being a maximum in the region of neutrality (*p*H 7) at room temperatures. In storage, any organisms which have survived will develop at a rate dependent on the final *p*H.

It will be seen from Table 1 that all fruits are safely acidic at room temperatures. During processing the temperature is raised to 240-270°F. and at these temperatures, the "neutrality" *p*H value drops to about 6. As most canned vegetables have *p*H values of 5·5-6·5 during processing, the lethal effect of hydrogen ions cannot be guaranteed. In canned fruits it will be seen that the average *p*H value is lower and the low final *p*H usually ensures that there is no bacterial action. The *p*H readings given are only average values of the varieties used for commercial canning and other varieties of a fruit may have considerably different values. The *p*H of a fruit therefore depends on variety; it also depends on ripeness. For example, Adam has recorded that unripe blackberries had a *p*H of 2·75, which increased to 3·45 when fully ripe. This change on ripening varies from fruit to fruit, but it appears that at the same state of ripeness the *p*H is constant throughout the entire season.

Table 1.—Typical pH values of Canned Fruits

	Average *p*H at Room Temperature
Loganberries	2·0-3·0
Plums, red	2·8-3·3
Plums, yellow	3·0-3·1
Plums, Victoria	2·9-3·2
Gooseberries	2·9-3·2
Apples	2·9-3·2
Blackberries	2·9-3·2
Raspberries	2·9-3·3
Damsons	3·0-3·3
Blackcurrants	3·0-3·3
Greengages	3·1-3·4
Rhubarb	3·1-3·4
Cherries, acid	3·2-3·4
Grapefruit	3·3-3·5
Strawberries	3·4-3·7
Apricots	3·4-3·7
Peaches	3·6-4·0
Pineapples	3·7-4·2
Cherries, sweet	3·7-4·2
Pears	4·0-4·3
Tomatoes	4·2-4·6

Table 2.—Typical pH values of Canned Vegetables

	Average *p*H
Carrots	4·9-5·4
Celery	5·2-5·5
Beetroot	5·2-5·5
Beans, in tomato sauce	5·2-5·6
Beans, runner	5·3-5·6
Potatoes	5·6-5·9
Spinach	5·6-6·1
Peas, processed	6·0-6·2
Peas, garden	6·0-6·2

Investigations have been made of the value of citric acid addition for the reduction of "hydrogen swells" in the case of cherries and prunes, and work has been carried out on the possibilities of reducing sourness by the addition of alkaline buffers. Corrosion of cans increases with acidity (low *p*H); this indicates yet another *p*H-measuring application.

In the case of canned vegetables, it will be seen from Table 2 that the average *p*H values are much nearer to neutrality and considerable research work has been carried out with a view to developing a process in which the *p*H value is reduced to a safer value.

Apart from the canning aspect, *p*H measurement of fruit juice is standard procedure. For example, concentrated lemon juice has a *p*H value of 1·8 approximately, fresh lemon juice a value of about 2·2, fresh orange juice a value of about 3·8 and banana juice 4·6. There is considerable scope for direct-reading meters in the determination of titratable acidity, since this technique enables all but the final addition to be made at full burette flow, and is unaffected by highly coloured solutions.

In addition to the measurements described above, preserve manufacturers use *p*H measurement to control the gelling of marmalades and jams.

Dairy products

Accurate *p*H measurements can be made of pasteurised whole milk, buttermilk, single cream, ice cream mixes and butter serum. In dairy work direct-reading meters are used considerably for titratable acidity determinations. *p*H meters have been used by the research laboratories of a large dairy products company for investigating the application of ion-exchange resins to milk and other dairy products (with a view to modifying their mineral salt content), since precipitation of casein, for example, readily occurs in the region of *p*H 5·7, its iso-electric point.

The same research laboratory has investigated extraction procedures for an antibiotic to be used later for controlling gas production in processed cheese. The routine control laboratories of this company carry out checks on the *p*H of milk powder after drying in a spray drying plant, for which purpose the powder is reconstituted to the original total solids of the fresh, skim or full-cream milk.

Cheese is another product whose *p*H value is important. For these determinations, a spear type electrode as illustrated in Fig. 2 above is recommended. This may be pushed into the cheese, avoiding the complication of emulsification in controlled quantities of water. For example, the *p*H of different batches of processed cheese varies with the age and type of the original cheese, but various types of bacterial deterioration subsequent to manufacture are characterised by a rise or fall in *p*H.

Research on hen eggs, with a view to increasing their storage life without ill-effect, has entailed *p*H measurement on a considerable scale. The object has been to adjust the conditions so that the *p*H of the egg-white is kept as near as possible to the iso-electric point of egg-albumin (*p*H 4). A series of accurate *p*H measurements has permitted specification of the optimum storage conditions of temperature, atmosphere, etc.

Finally it may be mentioned that a number of dairy laboratories make use of their instruments for periodic tests of cooling system brines, with a view to eliminating pipeline corrosion.

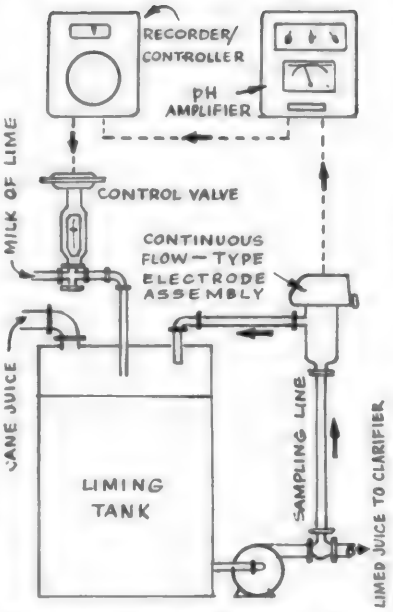

Fig. 5. Typical cane sugar liming plant control scheme.

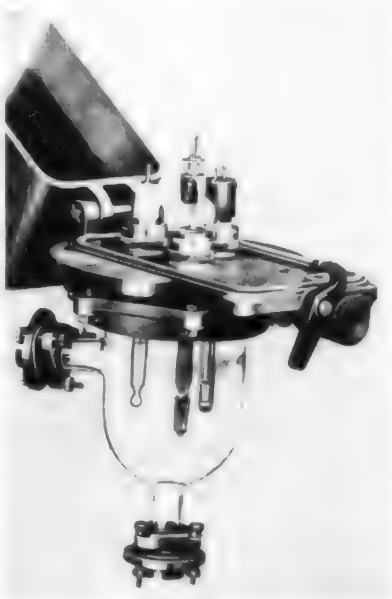

Fig. 6. Continuous-flow type electrode assembly.

Baking and allied trades

The *p*H value of dough has been shown by a number of workers to be of vital importance to the baking of bread. Most work has been carried out on aqueous suspensions of the dough or bread and it has been shown that *p*H values obtained using this method are related to the quality of a flour (from 6·2 for a patent flour to 6·4 for a second break) but it would appear that the spear type electrode as illustrated in Fig. 2 could eliminate errors due to impurities in the water used, and also afford a measure of the *p*H value under actual conditions. The electrode may be pushed into the dough or baked bread in company with a calomel reference electrode of the wick type, illustrated in Fig. 7.

Typical results, using this technique with a standard dough formula, show that the dough has an initial *p*H of the order of 6·1, falling very rapidly and reaching a value of perhaps 6 after an hour, at which value it remains until "knock-back." This causes a slight increase in *p*H (carbon dioxide being lost) but the value then falls steadily (by formation of carbon dioxide due to fermentation during scaling and moulding) to perhaps 5·95. During baking the bread becomes more alkaline and storage produces no change from the final value (*p*H 5·95 in the case described above).

The actual values obtained vary with formula, flour, yeast, water used etc., but in any one case serve as a useful method of test. It has also been shown that attempts to increase artificially the dough acidity finally result in a bread *p*H of the same order as before (*i.e.* 5·7-5·9). This would indicate that the optimum conditions may be selected for the various processes without effect on the *p*H of the bread finally produced. Enzymatic action can be increased to the maximum by controlling the flour and yeast at the optimum *p*H value (4·7-4·8 at 27°C. for diastase) and there is undoubtedly much work still to be done in this connection.

As an example of the variations

in flour supply mentioned above, Fisler, Halton and Carter,[2] have shown that the *p*H value of English patent flour at normal moisture fell from 6·10 to 4·11 after 78 weeks' storage and English low grade flour fell from 6·27 to 4·87, whereas Manitoba patent flour changed from 6·11 to 4·37 in 26 weeks and thereafter rose to 6·43; Manitoba low grade changed from 6·41 to a minimum of 4·57 in 27 weeks and then rose to 6·87. Tests on moist flour showed that as the *p*H did not tend to fall to the region of 4·5, bacteria were allowed to flourish. The ammonia produced caused a large rise in *p*H value; at a value of 7·45 mould growth was heavy and the smell intense.

The *p*H meter finds considerable application in the flour laboratory for determination of the titratable free fatty acids produced by oil decomposition. The phenolphthalein indicator sometimes used often gives a poor equivalence point because of opacity and fading. There is as yet no standard method, but the electrometric *p*H meter technique has so many advantages that it would appear to be only a matter of time before its use is specified. In the region of the equivalence point relatively large *p*H changes occur, and these give an unmistakable indication when a direct-reading instrument is used. A portable *p*H meter such as is illustrated in Fig. 3 may be used for checking the balance of, for example, self-raising flour in the mill itself.

In biscuit manufacture, it has been shown that cracking will occur if the *p*H is on the acid side. In cases where baking is carried out only to a desired colour, underbaking may occur owing to false coloration of the goods resulting from caramelisation of the starch and sugar. This can be brought about if the mixture is too acid or too alkaline. Best results are obtained in the range *p*H 7-8.

Where eggs are used (such as in sponge manufacture), attention should be paid to the *p*H value of the egg and the batter. It has been established that too high a *p*H reduces volume and coarsens texture. It is obvious that for reproducible results using a variable source of ingredients, *p*H measurement can be invaluable.

Fig. 7. Wick-type reference electrode.

Brewing, wines, spirits, soft drinks

*p*H values are of vital importance in all phases of brewing. Measurement and control of the brewing liquor, the wort, and the finished beer at racking is well established, but space does not permit the attention which this important subject requires.

Fig. 8. Immersion type electrode assembly.

In biochemical processing, such as the manufacture of fermented beverages, alcohol and vinegar, the *p*H value is critical and must be controlled at the optimum value.

Wines, spirits and vinegar are also often tested at the bottling stage. The *p*H value of some wines has to be kept quite acid to avoid bacterial growth. Typical values are: vinegar, 2·8-4·0; wine, 2·8-3·6; and beer, 3·9-4·7.

In the manufacture of soft drinks, *p*H control of the necessary neutralisation may be achieved by the use of meters, either under laboratory supervision or by fully automatic process control.

Thick stock syrups intended for subsequent dilution can develop surface scum in time; this mould growth is inhibited by increase of acidity to, say, *p*H 2·6.

In all processes that terminate in bottling, washing is essential and standard practice is to detect the presence of unwanted detergent with a *p*H meter. The strength of the detergent itself can be controlled at the most economic value by *p*H-measurement, and in some cases the installation of complete *p*H controlling equipment has been quickly and amply repaid by savings in material and time.

Meat and fish packing

Meat, of course, is an ideal medium for the growth of bacteria, and the rate of their development depends largely upon the temperature and *p*H value of the tissues of the carcase. Research has shown that fright and tiredness prior to slaughter removes glycogen from the muscles and considerably reduces subsequent lactic acid formation. The *p*H of the tissues is then high enough to encourage bacterial growth and at *p*H 6 and above this growth is fast. A number of meat processing firms have taken advantage of *p*H measurement at an early stage

to avoid losses and at least one inserts a spear type electrode (Fig. 2) in the chilled carcases as a guide to selection of the meat to be used first.

Typical values obtained for fresh meat are: beef, 5·1-6·2; lamb, 5·4-6·7; pork, 5·3-6·9.

As an example of the considerable work which has been done in the subject of meat *p*H, the investigation of McCarthy and Mackintosh[3] may be quoted. They investigated the *p*H of ham muscle, and found that readings ranged from 4·8 to 6·5. The *p*H value of pigs fed before killing was lower than that of pigs which were only allowed water. Similar but smaller effects were observed on resting the animals before slaughter. The importance of this discovery was emphasised by storing the carcases. The pork with the lower *p*H was perfectly satisfactory when the high-*p*H meat had developed a rank odour. Salt pork made from unfed pigs showed deterioration 11 days after curing; 21 days were necessary before that from fed pigs reached the same condition.

In tinned goods, the following *p*H values have been recorded: chicken, ham and tongue, 5·4; salmon, shrimp and anchovy, 5·5; salmon and shrimp, 5·8; steak, kidney and onion, 5·9; shrimp, 6·4.

Cutting[4] has investigated the changes in the *p*H and buffering capacity of fish during spoilage. The *p*H of the flesh of freshly killed fish and shell-fish is *p*H 7 approximately; this subsequently falls to a value between 6·1 and 6·9. With deterioration, the ammonia and amines produced cause an increase in *p*H to between 7·5 and 8·0.

Miscellaneous

The acidity of a coffee extract varies directly with the degree of roasting, a lightly roasted coffee giving a more acid extract than a heavily roasted coffee.

*p*H measurement is also of value in the manufacture of chocolate, cocoa and other beverages.

One of the most interesting ways in which adjustment of *p*H can aid industry is in the production of mayonnaise. In this case, higher yields and lower ingredient costs result from the use of *p*H as a means of lowering the surface tension of water to bring otherwise insoluble matter into suspension.

GENERAL APPLICATIONS

Water treatment

Numerous applications come under this heading. For example, in a closed-circuit steam generating plant one of the major problems is corrosion in the condensate feed-water system. Besides entailing expensive replacement of equipment, an uncontrolled system is wasteful in fuel, maintenance time, and losses during shut-down. Corrosion can be eliminated to a large degree by the installation of instruments, whose cost can often be repaid by the avoidance of one shut-down.

Nowadays there is an ever-increasing shortage of water for industrial purposes, and many factories can only contemplate expansion on condition that every available gallon is used and reused to the best advantage. Chemical neutralisation of contaminants and processing to the optimum working *p*H value is one of the more routine applications of automatic *p*H control. Where complicated schemes cannot be justified, some factories have installed alarm systems set to operate at predetermined high and low *p*H levels.

Effluent control

There is little need to emphasise the importance of this application to most industrial organisations. The increasingly strict limits that are being set by authorities everywhere make some form of *p*H measurement and control essential to any factory which discharges waste products. Instruments used range from the portable battery-operated type to complete industrial installations, in which an immersion electrode assembly (Fig. 8) often forms the measuring element. The advantages of the permanent records which the latter system can offer are self-evident.

A point that is sometimes missed when discussing effluent control is that it can often have distinct advantages from the point of view of the chemicals which can be reclaimed for re-use or sale as by-products. It can also produce savings in the neutralising agents normally added in excess when manual effluent control is practised.

The author thanks the many users of pH measuring equipment who have supplied information on their particular applications for use in the preparation of this review.

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Sugar Confectionery in France

As a source of instruction or a means for improving present methods in the sugar confectionery industry, a recent French book* (the first in a series devoted to all aspects of the confectionery industry) has much to recommend it. Written by a confectioner of 50 years' experience, 25 of which have been spent as a consulting technologist to the chocolate confectionery industry, the book contains many manufacturing formulæ suitable for both the large and small scale manufacturer.

Divided into two parts, the first deals with the raw materials and ancillary products of the industry, large and small scale equipment, and wrapping materials and machinery. The second is concerned with working formulæ and processing methods for various types of sugar confectionery, and the utilisation of waste material. Sugar decorations are the subject of a final section of this part.

The value of the book would be considerably enhanced by the inclusion of an index.

* *Le Sucre Cuit*. By Armand Kopka. Pp. 237+xxviii. Paris. Price 1,650 frs.

COD – The Beef of the Sea

By C. L. Cutting, B.Sc., Ph.D., F.R.I.C.

(*Food Investigation Organisation, Humber Laboratory, Hull, D.S.I.R.*)

In this article the author describes the catching and preservation of cod from the earliest times to the present. It is based upon material in his book "Fish Saving — A History of Fish Preservation from Ancient to Modern Times" which is to be published in March by Leonard Hill Limited, 9 Eden Street, London, N.W.1. (Pp. approx. 350, illustrated, 42s. net.) A further article, on herring, will appear next month.

ALTHOUGH fish was preserved against bacterial decomposition by drying and salting in Ancient Egypt and Babylonia and later in the Mediterranean by the Greeks and Romans, it was not until the Middle Ages that the basic techniques of preservation still current to-day were developed in Feudal Europe to take advantage of the abundance of cod and similar white fish and herring. The industries based on these two main classes of fish have always been largely self-contained, employing separate and distinct methods of catching and preservation, which reflected their biological differences. "White," or demersal fishes, of which the gadoid (*i.e.* cod like) species are the most important, cod itself preponderating, are practically always there on the sea-bed for the catching. Their fishery was therefore both more static and more widely diffused than that for herring and similar pelagic, surface-shoaling species, which are seasonal and migratory. In addition cod, like most white fish, contains little or no fat in its flesh and therefore lends itself readily to a simple and effective cure merely by drying or salting and drying, in the sun and wind; whereas herring subjected to a similar process would soon become intolerably rancid owing to its high content, at most times of the year, of oil which is moreover highly unsaturated, and therefore particularly prone to atmospheric oxidation.

Types of product

The snail's pace of Medieval transport by sail and, even more laborious, by packhorse along often impassable roads, meant that outside the actual ports very little fish reached consumers other than in the heavily preserved state. Moreover, fishing vessels could not go far from the shore without using some method of preservation during the return voyage, although some inshore boats would try to bring live fish in the well of the ship. Fresh fish, "fresh" often only in name, was a relatively expensive luxury. Freshwater fish was much more commonly favoured as an item of the diet than it is to-day, precisely because it was easier to serve fresh after catching. It was frequently reared for the table in "stews," or dammed up ponds, or kept alive in fresh water until sold, or even, according to Daniel Defoe in 1724, transported by road from the Fens to London in the live condition. Shakespeare uses dace, pike, tench, eels, salmon and trout freely in simile and metaphor and Ben Jonson's reference to "Fat, aged Carps, that runne into the net, And Pikes . . ." is almost pastoral. Far more opprobrious are the remarks about "old ling" (in "All's Well that Ends Well") stockfish (used by Falstaff among other salubrious epithets in describing his feelings for Prince Hal), "Poor John" (suspected of responsibility for the "ancient and fish-like smell" ultimately traced to Caliban) and "haberdine" in Thomas Nashe's "Supplication to the Divell" (". . . and, which is lamentablest of all, that without mustard"), all of which were forms of salted or dried cod.

"Lochefisshe" sold at Blakeney (Norfolk) fish fair in 1357 was apparently of three types, "lob," ling and cod, whilst "orgeys" were "fish larger than lob." The origin and meaning of some of the terms are obscure. Unspecified "specys of salt fisch" are a common entry in the account books of Bristol and Exeter merchants. "Poor John" seems to have been chiefly small salted cod or hake. "Haburden" or "haberdine," probably so called from the Basque province of Labourd, and nothing to do with Aberdeen, was a larger variety of hard-dried salt cod. "Millwell," or "mulvel" (perhaps connected with French "merluche," *cf.* "merlus" for hake) was most likely something similarly salt and dry. Ling, although a definite species distinct from cod, was a term used for salt fish generally. The following quotation is an example of this confusion:

> "Ling perhaps looks for great extolling, being counted the Beefe of the sea, and standing every fish day (as a cold supporter) at my Lord Mayor's table; yet it is nothing but a long cod; whereof the greater sised is called Organe Ling and the other Codling, because it is not longer than a cod, and yet hath the taste of Ling: whilst it is new it is called Green-Fish; when it is salted it is called Ling."

More likely of course "codling" was the diminutive of "cod" and nothing to do with "ling." Moreover, "green fish" seems to have been wet salted cod, which after drying became "ling." "Mudfish" seems to have been another name for undried wet salted fish, although its name bodes no great cleanliness.

"Baccalao," the Spanish for dried, salt cod, was a term already in use at the time of Hakluyt. It

may have been derived from "baculum" (=a stick, also the ensignia carried by the god Hermes-Mercury) and in that case it might be cognate with "stockfich," which, however, is also said to have been so called from the sticks or poles on which it was hung to be dried. However, unless there is some confusion in contemporary accounts or in those of historians, "stockfish" seems, unlike the present-day product, sometimes to have been salted as well as dried, and it is possible that it was used as a generic term for all fish dried in the round or partly severed state, sometimes with the head on, as distinct from the much improved, cleaned and headed "salt fish" or "ling" from which the backbone had been mostly removed after splitting. According to Bristol records in 1471, stockfish at £5 per last (of 12 barrels, total net weight about two tons) was only about half the value of saltfish.

Norway

The chief areas for making stockfish were Norway and Iceland The climate near the middle of the coast line of Norway, with its cold, dry spring and plenty of sun was ideal for the preparation of such a product, which would have decomposed excessively during the process at higher temperatures and humidities. German merchants handled this product, from the twelfth century onwards, and finally the Hanseatic League about 1350 established its office at Bergen on what was until 1945 known as the Tuske brygge (German Quay). The Hanseatic Museum situated on this quay to-day is a representation of a Hanseatic merchant's business and living quarters combined. The cod and sturgeon hanging from the ceiling are reputed to have been put there when the place was rebuilt in 1702 after a fire. The facsimile of the original tally board includes "lob" once again, "rundfisch," *i.e.* round fish, and "rotscher" or split fish, types being produced to this day. Cod liver oil ("tran" or "train oil") for illumination and leather dressing was an important by-product. Lamps consisted of square black iron trays with a wick hanging from each corner. The importance of the stockfish trade was such that the heraldic arms of the Bergen office consisted of half the German eagle and a stockfish, crowned.

Iceland

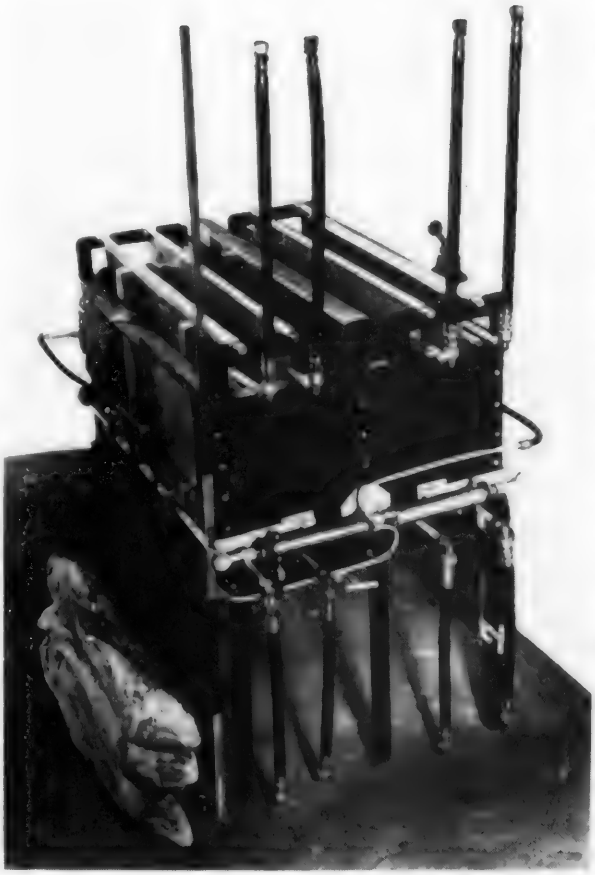
Iceland, originally a Norse settlement, got isolated from first Denmark and then Norway as a result of the Hansa closing in on Bergen. Therefore, when English fishermen, always looking for fresh grounds, and English merchants, always looking for fresh markets particularly for England's principal industrial product, woollen cloth, ventured to Iceland about 1412 they were at first welcomed. The trade grew rapidly for a period and a writer in 1436, quoted by Hakluyt, could already say that "of Yseland to write is lytile nede, Save of Stokfische," which even provided the currency in which exchange rates for imports were expressed, *e.g.* 3 fish were equivalent to one pair of lady's shoes, 15 fish to one firkin of honey, fish being defined as "piscis durus vocatus stocklysch." The English fishermen used some salt in preserving their catch. Both the fishery, in which East Anglian men were prominent, and the trade, which was chiefly in the hands of Bristol and London merchants, were interfered with by the Danish King who tried to assert his sovereignty. However, at one time even a tiny part like Walberswick, in Suffolk, now derelict and silted up, had "13 barks" in the Iceland trade, Camden at the end of the sixteenth century attributes the prosperity of Hull largely to "their trade in Iseland-fish, dry'd and harden'd, term'd by them Stockfish; which turns to great gain and has strangely enrich'd the town."

The waters between Britain and Iceland were also fished, particularly around the Shetlands, which were also under Danish control until they were put in pawn to Scotland in lieu of a dowry for a royal marriage in 1469, and never redeemed; and the Faroes which remained Danish.

Newfoundland

But the hampering restrictions of the King of Denmark were rendered less critical with the discovery in 1497 of Newfoundland by Cabot, backed by Bristol merchants. It was reported on his return "that the sea there is swarming with fish . . . (and) . . . that they could bring so many fish that this Kingdom would have no further need of Iceland." Nevertheless, although fishermen from the Atlantic ports of France, and for a time, Portugal, and to a lesser extent Spain, began to exploit the "new found land," it was some while before the English paid it much attention. Following Sir Hugh Willoughby's disastrous expedition to Lapland in 1553, they pushed along the "North East Passage" as far as Nova Zembla by 1580, where they specially noted "what plentie of . . . fish is to be found there, to the end we may turn our newe found land fishing or Iseland fishing . . . that way." Frobisher in 1577, searching for the "North West Passage" to Cathay, noted off Greenland "that this coast seemeth to have good fishing." However, the victory over the Armada, the rise of Holland as a rival power in the North Sea after they had expelled the Spaniards and the insistence of Denmark on the payment of licence fees for the Iceland fishing turned English attention westward. Plymouth, Weymouth, Poole, Southampton and other south-west ports took a leading part in the Newfoundland fishing, Plymouth alone having 50 vessels there in 1595.

The French had access to plenty of solar salt, made by the evaporation of sea-water in the Biscayan marshes. They therefore went in for the green fishery, or "core" fishery, as it was also called. According to one account their process was as follows. The fish after landing on deck were placed on narrow tables where one man cut off the head and threw it into the sea, a second cut open the bellies and eviscerated them, and a third cut out the backbone after which they were passed below deck to the



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Better methods of preserving fish at sea are urgently needed, and one promising development is the Torry Research Station vertical plate freezer, a pilot version of which is shown above.

salter. On the bottom of the hold, fish were arranged head to tail and covered with a layer of salt. Successive layers of fish were laid on top and similarly salted until the end of the day. After the fish had been left three or four days and the brine formed by the water drawn out of the fish by the osmotic action of the salt had been drained away, the surplus salt was removed and the fish were put down in new layers and covered with new salt as before. This last treatment was regarded as final and the fish were ready to be taken to France, where it seems to have been sold in barrels because it was said of the English at the end of the sixteenth century that they "had not the use of barrelling up of cod, and if it be not barrelled it is not vendible in France." It was chiefly consumed in Paris during Lent.

British fishermen were short of suitable salt, and at first traded with the Portuguese fishermen (who "made all wet" fish but dried it when they got it home) for their surplus. They therefore had to make do with a less salty cure which had to be dried in order to keep and it was here that their Iceland experience proved valuable. Settlements near the fishery grounds were desirable, where drying conditions were good. Sir Humphrey Gilbert had occupied Newfoundland in 1583 in the name of Elizabeth I, and he granted drying grounds to settlers on the East coast.

Later in 1602-3 New England was colonised by some fishermen because the climate was more suitable for drying and there were numerous convenient rocky beaches on which to lay out the fish. The French when driven away from the coasts of Newfoundland discovered the prolific Grand Bank. They also settled in Cape Breton Island, Nova Scotia, and the Gaspé Peninsula on the southern shore of the Gulf of St. Lawrence, but the climate there was poorer and fish had commonly to be dried on hurdles, known as "flakes," because of the lack of suitable beaches.

The rivalry between French and English over the Newfoundland fishery, after Spain and Portugal had disappeared from the scene, was not the least of the causes of the War of the Spanish Succession and the Seven Years' War. Under the provisions of the Treaty of Utrecht (1713) the French were allowed "to catch fish and to dry them on the land" only on the West coast of Newfoundland which was less favourable climatically. The Treaty of Paris (1763) led to their forcible eviction from Cape Breton, although they were still allowed a foothold on St. Pierre and Miquelon. On the less accessible Gaspé Peninsula the combination of climate and shortage of salt led to rather a chancy cure, with what has come to be regarded as a specially attractive flavour to the present day.

With the French threat removed, the friction between England and New England now came to a head. One of the bones of contention was the mother country's determination to monopolise the West Indian trade. New England, perhaps on account of the warmer climate, produced a high proportion of unmarketable salt fish, which was used to feed the plantation slaves, who were, however, not too servile to murmur at this "refuse fish," which would probably have been contaminated with the familiar, pink halophilic micro-organisms. After the Declaration of Independence the House of Representatives of Massachusetts at Boston in 1784 decided in a resolution "to hang up the representation of a cod fish in the room where the House sit, as a memorial to the importance of the cod fishery to the welfare of this Commonwealth."

A century later Rudyard Kipling in "Captains Courageous" (1897) vividly depicts a still thriving industry of splitting and salting at sea fish caught from small "dories," a method adopted about 1855, which gave more movement to the hook and thus attracted fish better than the French method of fishing from the vessel itself, as described by Pierre Loti in "Pêcheur d'Islande" (1886).

However, there were frequent complaints in all the countries concerned about the quality of the product, which although nothing like fresh fish, nevertheless developed standards of its own, departure

from which might be attributed variously to incompetence, cupidity or the impossibility of controlling natural phenomena.

The Shetlands

Nearer home the waters round our coast were exploited, and cod salted and dried in the traditional manner at numerous villages, particularly in Scotland. Such an industry sprang up in the Shetland Islands as a result of the heavy duties and restrictions on the use of salt introduced in 1712, and was encouraged by government subsidies known as "bounties." "Sixerns," open boats with an 18 ft. keel, manned by six men and a steersman would be rowed perhaps 40 miles to the "haaf" (deep sea) fishing grounds from stations at the extremities of the Islands. Here the fish were brought to be gutted, split, salted and laid out to dry on stony beaches. The living conditions of the men, who were also partly crofters, were not far removed from slavery in the days before the Truck Acts, and the resentment engendered against their Scottish task masters still smoulders. Not until the middle of last century were the boats decked and, not long after, the advent of the steam trawler with its increased exploitation and efficiency, put an end to the haaf fishing.

At the same time the developments of the machine age, particularly the improvement in communications brought about by the railway, made possible for the first time the large-scale marketing of fresh fish, the competition from which spelt extinction for the salt fish trade in industrialised countries. However, so far as the world as a whole is concerned, the salt fish trade even to-day, shows few signs of declining—in fact, rather the reverse.

Cod smacks

One way of preserving fish is to keep it alive until the last possible moment. In the eighteenth century, as the population of Britain expanded, and also her wealth as the leading industrial nation of the world, organised attempts were made to bring fish to port in the live state. "Well-vessels," consisting of a large tank amidships in which holes were bored to allow free circulation of sea-water, were introduced at Harwich from Holland in 1712, and Defoe noted them soon afterwards at Barking, which was thus able to land fish alive at Billingsgate for the London market and became one of Britain's leading ports until about 1900. Grimsby, which revived with the arrival of the railway in 1848, also went in for this "live-fishing," which continued into the present century. Hull was too far up the Humber estuary to participate, the water being too fresh.

The fish were caught on baited hooks fitted with a gorge to prevent swallowing, thus minimising internal damage, and were handled carefully and thrown into the tank tail first to avoid injury. Cod was the principal species brought back. If not caught at too great a depth, it survived the change in pressure on being brought to the surface, and could normally be kept alive in the well for a week or two. Their swim-bladders, which were distended after catching, had to be punctured so that the fish could right themselves. Fish that died were removed daily and salted or, later on, iced. At Harwich, and later at Grimsby, the fish were taken from the well and kept in large chests floating in the harbour, 40 to 100 fish in each according to size, for a further week or two without adverse effect. Up to 400 such chests were in use at Grimsby. These cod were highly esteemed in London and a large fish would sell at Billingsgate for over £1.

Trawling, icing and railways

It was the combination of trawling, the use of ice, and rapid transport by rail which in the second half of last century converted fish from an expensive luxury into a staple food of the poorer classes and made possible the institution of the fried fish shop in Britain.

Catching fish by dragging a net over the sea-bed was probably introduced from the Zuyder Zee in the eighteenth century and efficient fishing methods suitable for the open sea were developed by the men of Barking and Brixham. Rich fishing grounds were discovered in the North Sea in the middle of last century, and Brixham men settled in Hull, and Barking men in Yarmouth. Since trawled fish was normally dead by the time it reached the deck, it had to be landed and sold quickly before it went bad. It was therefore gutted and washed and a Barking firm developed a system of fishing in fleets, the catch of which was despatched to market daily in a fast carrier, steam propelled after 1864. They also collected ice from the Thames marshes and stored it for issue to the carriers to keep their fish cool, and thus delay its decomposition. Finally the railway network permitted rapid distribution of this iced fish. The use of ice on the actual trawlers gave them increased scope. Fleeting actually survived the transition from sailing to steam trawling and continued from Hull on a decreasing scale until the 1930s.

The successful application of steam to the trawler in 1883 further increased fishing range and made landing practically independent of storm or calm. Ice at first imported from Norway and U.S.A. and then, at the end of the century, manufactured by means of artificial refrigeration machinery at the port, became cheaper and more plentiful, until to-day practically as much ice is taken to sea as the quantity of fish landed.

Increased size and efficiency of trawlers resulted in over-exploitation of the North Sea and nearer waters, and as a result ever more distant grounds have been discovered and exploited, *e.g.* Iceland (1895), Barents Sea (1905), Bear Island (1920s), even Greenland and Spitzbergen and occasionally Newfoundland and Labrador. The catch from these distant waters is principally cod, which is still by far our most plentiful species, over 300,000 tons being landed annually, compared with about 80,000 tons of haddock, and 30,000 tons of plaice. But cod is no

longer really fresh after about a week in ice and becomes stale and unpalatable after about 14 to 16 days. With fishing grounds 5, 7 or even 9 days from port, it is obvious that in order to operate economically, the modern distant water trawler cannot help bringing in comparatively little really fresh fish and some that is quite stale, and sometimes condemned as unfit for sale.

This *impasse* necessitates a better method of preserving fish than packing in ice. The only solution forseeable at present is freezing the catch, or the first part of it, on the fishing ground. Rapid freezing and proper cold storage at say −20°F. can keep freshly caught fish in very good condition for at least six months. The difficulties consist in adapting the freezing process to conditions at sea, and if possible fitting it into existing trawlers. If this cannot be done, there is no hope of ever again obtaining our cod as fresh as it must have been in the days of the cod smacks and fleeting only 50 years ago.

This paper was prepared as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research.—Crown copyright reserved.

Bacteriology of Semi-preserved Meats

THE first International Symposium on Food Microbiology, organised under the auspices of the International Association of Microbiological Societies, took place recently at the Pasteur Institute of Lille. It lasted four days (October 11-14) and was wholly devoted to the bacteriology of "semi-preserved" meats.

A desire for such symposia was voiced at the VIth International Congress for Microbiology, in Rome in September, 1953; the idea being to bring together in more thorough discussion the views of both commercial and academic workers, in the hope of reaching practically useful conclusions in what is by its very nature an "applied" science. The intention was that all participants in these symposia should be recognised experts in the subject in question, so as to keep the discussions within relevant bounds, and hence the participants were invited individually. The British representatives, on this occasion, were Dr. F. H. Banfield, Dr. E. M. Barnes, Mr. D. H. F. Clayson, Mr. N. Goldenberg, Mr. H. B. Hawley, Dr. Betty C. Hobbs, Dr. M. Ingram, Mr. Osman Jones, Prof. R. Lovell and Dr. P. M. F. Shattock, besides Mr. A. D. Brown (Brisbane) and Mrs. R. Mullaney (Dublin). In all, there were about 80 representatives from 16 different countries.

"Semiconserves"

The first morning was devoted to a discussion of the nature of the foodstuffs which are called on the continent "semiconserves" or "Halbkonserven." This means non-sterile foods in hermetically-sealed containers, and it is evident that our term "semi-preserved" has a much wider meaning: "semi-conserves" would be more apt, were it not that in English the word "conserve" carries the implication of a sugar preserve. There then followed a discussion of the basis for the thermal destruction of micro-organisms in such foods, and of the problems of heat penetration, in which the most remarkable item was a description by Dr. Gisske (Kulmbach) of experiments apparently showing that processing of cans in hot air gave better heat penetration than processing in hot water. Mr. Clayson then set out the requirements of the user of non-sterile canned meats.

Bacteria

In the afternoon Dr. Ingram and Prof. Lerche (Berlin-Dahlem) gave a general survey of the nature of the various groups of bacteria likely to occur in semi-preserved meats, especially canned ham as the most important by far of such products; and the following day was wholly devoted to detailed consideration of the occurrence, nature and significance of these groups of bacteria. The Clostridia, especially *Cl. botulinum*, were dealt with by Prof. Halverson (Urbana), Prof. Prevot (Paris) and M. Beerens (Lille), who revealed that raw meat contains substances which enhance the heat resistance of bacterial spores; that the heat resistance of one anaerobe may be increased by the presence of another; and that some anaerobes (notably *Cl. histolyticum*) which are normally regarded as unable to form gas may do so very vigorously in meat media. Prof. Kingma-Boltjes dealt with the *Bacilli*, whose spores usually occur in non-sterile meat products, and pointed out the importance with canned cured meats of the denitrifying species which produce nitrogen from nitrate plus carbohydrate. The paper of Dr. W. J. Scott suggested that the only way of eliminating staphylococci was by heating. The same holds for the fæcal streptococci which, according to Drs. Barnes, Ingram and Shattock, can be distinguished as coming from the pig or from human sources; a paper by Dr. Niven (Chicago) emphasised the possibility that these organisms may cause food poisoning. Dr. Clarenburg (Utrecht) showed that, to eliminate even the relatively sensitive members of the *Enterobacteriaceæ*, one must chiefly rely on the heating process, and it became obvious in discussion that the heat resistance of such bacteria as salmonellas might be higher in canned meats than is generally supposed. Dr. Ingram rapidly reviewed several other groups of non-pathogenic bacteria which had been regularly found in canned ham—*Achromobacter-Pseudomonas*, *Corynebacteria*,

Lactobacille and *Micrococci*—all of which should be destroyed by heating.

The chief impression from these discussions was the dearth of information about the effect of practical conditions on the heat resistance of most of the organisms involved. In relation to the manufacture of "sterile" canned foods, the obvious necessity for destroying bacterial spores stimulated a vast amount of work on the heat sensitivity of spores; but the enormous industry which depends on pasteurising foods (other than milk!) seems to have paid very little attention to the quite different groups of bacteria which are correspondingly important in this type of process.

Manufacturing aspects

The morning of the third day was chiefly devoted to particular aspects of manufacture: the curing of the meat (Dr. Debrot, Lausanne); the important part played by gelatin in the bacterial contamination of semi-preserved foods; and the bacteriological status of spices and other ingredients. The enormous contaminations introduced by normal edible gelatin, or spices, etc., were so striking as to stimulate efforts to reduce them. Dr. Buttiaux (Lille) described the introduction in France of extremely stringent bacteriological standards for gelatin for canning, which had been successfully attained by the manufacturers, and had led to a great reduction in spoilage. Dr. Mossel (Utrecht) suggested that the dangers of contaminated spices, etc., could be avoided by suitable sterilisation, or the use of extracts.

The afternoon was wholly occupied by discussions of the methods of bacteriological examination used in different countries. It became obvious that quite different approaches were used in examinations for the producer and for the consumer: the former placing most emphasis on stability during storage as indicated by incubation of cans, the latter placing most on careful scrutiny for potentially harmful species.

On the last morning, Prof. Penso (Rome) first briefly described how to identify different kinds of meat serologically, and Prof. Keller (Giessen) presented a most unusual viewpoint on the bacteria developing aroma in cured sausages. Then Mr. Goldenberg described his examinations of canned ham, which emphasised the frequent occurrence of fæcal streptococci, and led him to suggest bacteriological standards for canned ham, which would protect the consumer under normal conditions of use and which—in his view—manufacturers could attain. The proposals of the scientific committee of the symposium were then compared with those of Mr. Goldenberg and, after much discussion, almost complete agreement was reached on the normal bacteriological picture which one might expect in canned ham. The greatest debate was upon the presence of gas-forming clostridia—everybody finally agreed that they should be absent, but one Dutch manufacturer insisted that this could not at present be achieved.

Bacteriological examination

The closing afternoon, devoted to details of the technique of bacteriological examination, opened with a paper from M. Cheftel (Billancourt) which raised some of the difficulties in getting (*a*) sample cans representative of a batch and (*b*) representative bacteriological samples out of these cans. The subsequent discussion was chiefly concerned with the period of incubation desirable before subjecting a canned ham to bacteriological examination, and some agreement was reached about the very various procedures used by different workers. There was, unfortunately, no time left to embark on the large subject of the actual bacteriological tests used, or even to attack Dr. Buttiaux's proposition that the exact technique of these tests is of secondary importance because—if properly carried out—different tests will yield much the same results.

The chief criticism of the symposium might be that too much was crammed into four days. Nevertheless, it was generally regarded as a distinct success, for the number of new ideas thrown up and the general agreement finally attained, and its proceedings are likely to be for some time a standard work of reference on the bacteriology of canned ham and non-sterile canned meats generally. All the papers are to be printed, with the major items of discussion, as a special number of the *Annales* of the Pasteur Institute of Lille which will shortly be available from Editions Medicales Flammarion (26, Rue Racine, Paris) at about 20s.

Minerals in Industry

BASED on his 50 years' experience in the developing and marketing of minerals and mineral products, Mr. S. A. Johnstone has produced a book* of great value to producers and consumers for whom it is primarily intended.

It presents in a concise form essential information on the properties of substances of mineral origin which have found increasing use in the chemical and allied industries, such as those producing ceramic materials, refractories, building materials, paints, etc. It also contains information on their sources of supply, processing, and metallurgy, with special reference to specifications laid down for their uses in particular industries.

The book is divided into sections, each of which deals with an individual mineral or metal and each having a useful bibliography appended for the enquiring reader.

No less than 71 basic metals and minerals—from aluminium to zirconium—are dealt with in this compact encyclopaedia, which should also find a place on the shelves of technical information bureaux and of teachers in universities and technical colleges having courses in economic geology or mineralogy.

* *Minerals for the Chemical and Allied Industries*. By Sydney J. Johnstone, O.B.E., B.Sc.(Lond.), F.R.I.C., M.I.M.M Pp. 692. Chapman and Hall. Price 75s.

The Production of Whey Powder

By J. G. Harries

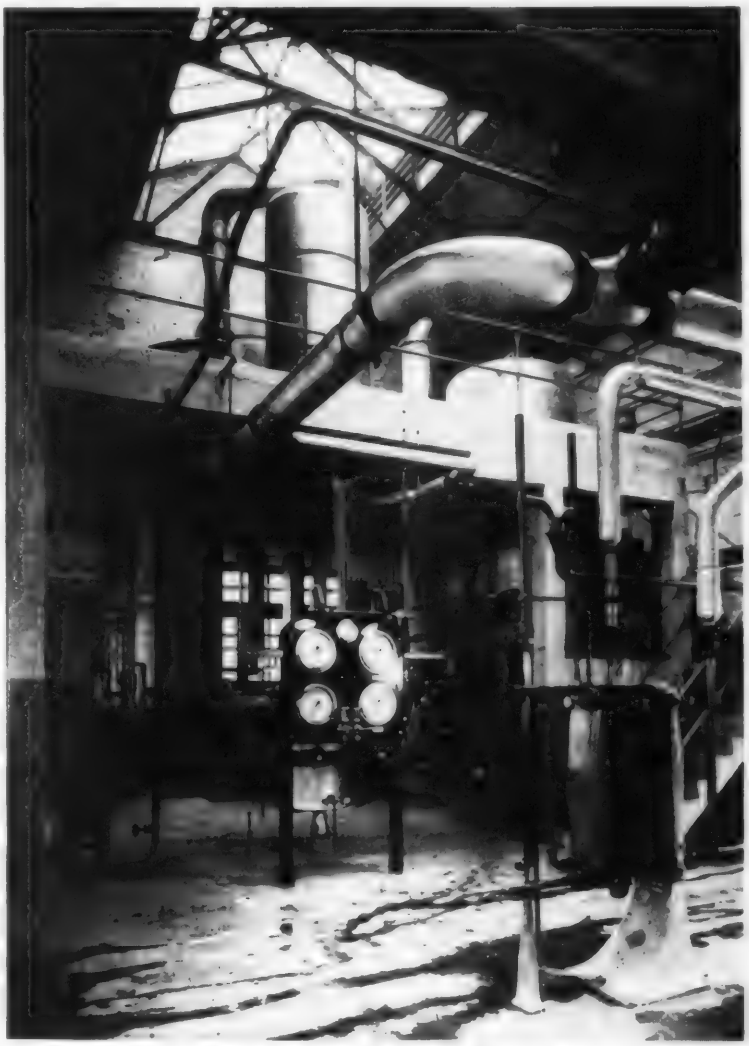
(*Milk Marketing Board, Thames Ditton*)

In the cheesemaking process more than half the total solids in the milk used appear in the whey. The high nutritive value of this dairy by-product has long been recognised, especially by pig breeders. In this article some details are given on the method of drying whey to produce a high class feedingstuff for calves, pigs, and poultry.

IT is estimated that in 1953 137,500,000 gallons of milk were manufactured into cheese in England and Wales, and it can be assumed that from this approximately 120,000,000 gallons of cheese whey would be produced. A substantial quantity of whey is manufactured in one form or another and a fair quantity of liquid whey is used for pig feeding on farms, but this article is mainly concerned with whey powder production.

Whey drawn off from cheese vats contains varying quantities of fat, protein, lactose, and mineral salts. The total solids content varies from, say, 6·50 to 6·80 per cent. or higher, and the water content is approximately 93·2 to 93·5 per cent. The butterfat content of the whey will depend on several factors, such as the type of cheese produced and the method of cutting and stirring the curd. Careless cutting of the curd can cause excess quantities of fat to be passed in the whey. It would appear that with modern vats fitted with automatic curd cutters and stirrers more fat is retained in the cheese and consequently the percentage of fat in the whey is reduced.

The first stage in the process of manufacture is to recover the butterfat by passing the whey through a separator. If 0·3 per cent. fat remains in the whey off the vat, and this quantity is recovered, it would mean 30 lb. of butterfat per thousand gallons of whey, and this should produce approximately 35½ lb. of whey butter.



Evaporating plant at the Milk Marketing Board cheese factory at Wem.

Requisites for good whey drying

It must be emphasised that in order to produce good quality powder the whey must be handled hygienically at all stages. Whey can develop acidity very quickly, and if this is excessive (beyond 0·25 per cent. calculated as lactic acid), then during drying the whey will not leave the knives but will form a sticky mass on the rollers, resulting in overheating and charring. Several attempts have been made to neutralise whey of high acidity, but it is extremely difficult to obtain constantly satisfactory results. Formalin added to the whey in small quantities, up to one pint per thousand gallons of whey, will retard the development of the acidity.

The ideal way to handle whey would be to have a steady flow off

the vats, through the cream separators, and passed through the evaporating plant. However, this is not always possible and whey is normally produced in the cheese room at a rate higher than the capacity of the drying plant. The temperature of the whey drawn off the cheese vats will vary according to the type of cheese produced. In Cheshire cheese production the temperature will be around 90°F. and for Cheddar cheese a temperature of around 100°F. will be obtained. It is an advantage to maintain these temperatures, to facilitate the cream separating process.

Roller drying

After passing through the cream separator, the whey can be passed over drying rollers to produce the coarse pieces of dried whey. The capacity of the rollers is limited and the quantity on each set of rollers per hour is not great, say from 20 to 150 gallons per hour according to size. The size of rollers can vary from 24 inches in diameter by 48 inches long to 48 inches diameter by 120 inches long. The steam consumption on the rollers to evaporate, say, 90 per cent. of the water in whey is fairly substantial and costly. The water is, in any case, evaporated by heat and the major item of cost is in the form of coal or oil to produce the heat. As an illustration, about 1·5 lb. of steam are required to evaporate 1 lb. of water on roller driers.

Pre-condensing the whey

In many cases, especially where a large volume of whey is to be dried, it is usual to pre-condense the whey and pass the concentrated liquid over drying rollers. Water can be evaporated more economically in an evaporator under vacuum than by passing the liquid over rollers. The steam consumption will depend on various factors and, after allowing for steam used in obtaining the necessary vacuum, about 0·7 lb. or less will be necessary to evaporate 1 lb. of water. Economy in the cost of steam is achieved by passing the high pressure steam through a steam engine and using the exhaust steam for heating the evaporator. In turn, the steam engine is used for driving the drying rollers for the final drying of the condensed product obtained from the evaporator.

If the drying rollers are driven by electricity, with no other source of exhaust steam available, a double effect thermo-compression evaporator can be used with advantage, as the steam then required to evaporate 1 lb. of water is estimated at 0·43 lb. However, a thermo-compression evaporator requires high pressure steam, whereas a double effect evaporator can operate on low pressure exhaust steam.

Two-stage evaporation

In a double effect condensing plant, the whey is fed to the feed vessel and drawn by vacuum into the first stage calandria. This consists of 105 vertical tubes about 10 feet in length and 2 inches in diameter. Exhaust steam from a steam engine is passed between the tubes for heating the whey.

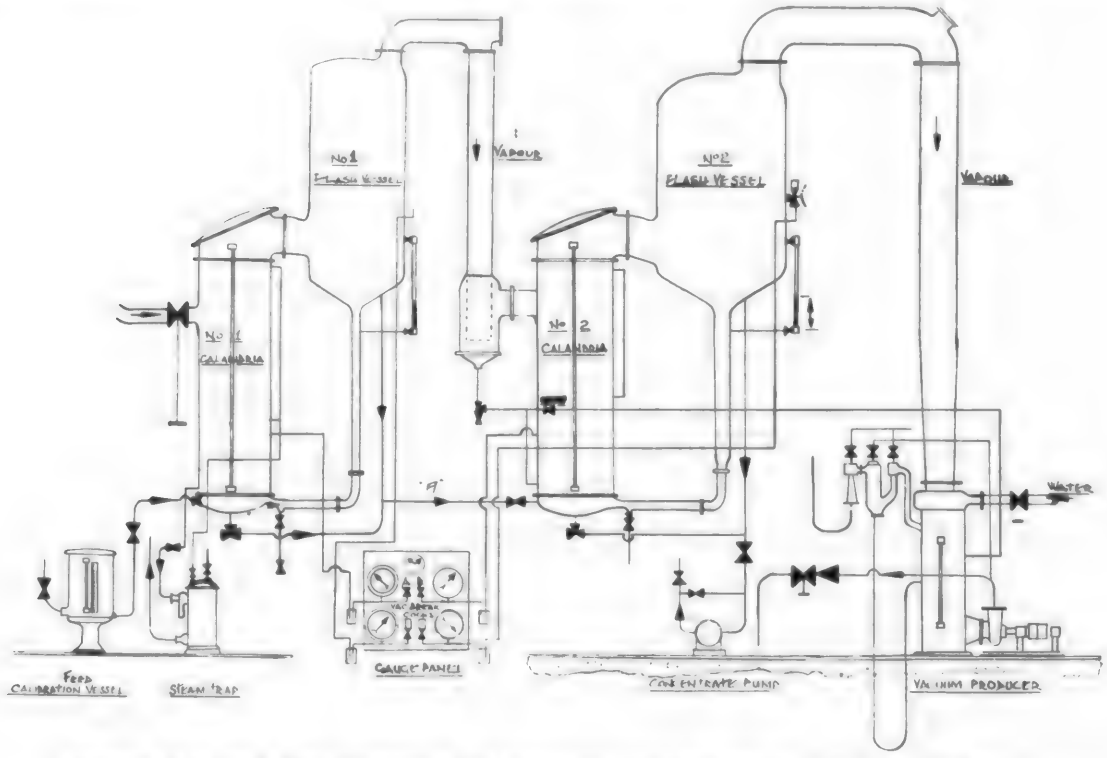
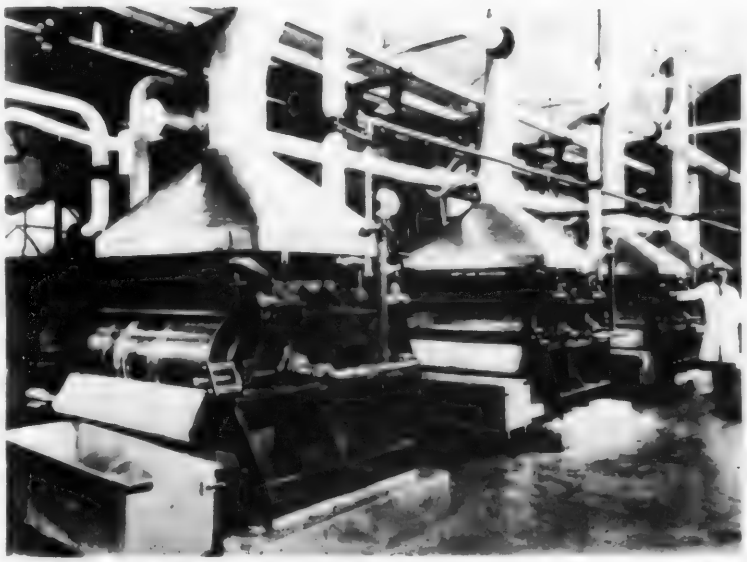


Diagram of a double effect condensing plant for pre-evaporating whey before roller or spray drying.



Steam heated roller driers for making whey powder at the Milk Marketing Board plant at Aspatria.

The whey is drawn into the No. 1 flash vessel, where a vacuum of 19 inches is maintained, and evaporation takes place at a temperature of 165°F. The liquid in the flash vessel can be recirculated through the calandria and, when the desired concentration is obtained, it is passed through the pipeline marked "A" to the second effect calandria. This calandria is similar to the first stage, but contains 123 tubes. Heating the second stage calandria is effected by passing the vapour from the first flash vessel between the tubes of the second calandria. A vacuum of 26 inches is maintained in the second flash vessel and evaporation is achieved at a temperature of 126°F.

When the desired concentration is achieved the liquid is withdrawn from the last flash vessel by a pump, and stored in a balance tank to feed the rollers.

Production of whey rock

The plant in question is designed to receive 1,200 gallons of whey per hour, and the quantity of concentrated whey will amount to approximately 400 gallons per hour. It will be clear that 800 gallons of water have been evaporated in this stage of handling. With fresh whey at, say, 6·5 per cent. solids, the concentrated product will have approximately 19·5 per cent. solids. For roller drying, it is unwise greatly to exceed this figure, but if a spray drying plant is used much higher concentrations—about 40 to 50 per cent.—are possible.

The concentrated whey is then distributed over four sets of twin rollers each 100 inches long by 36 inches diameter, this whey being gravity fed from an overhead balance tank on to a distributing trough on the rollers. The capacity of each roller is approximately 100 gallons of the concentrated product, which contains about 19·5 per cent. solids. This liquid is dried on the rollers, giving a product containing 2 to 5 per cent. of moisture. The product coming off the rollers is in the form of fairly firm pieces, usually referred to at this stage as "whey rock." This product, of course, must subsequently be milled to produce the powder.

Great care must be taken to ensure a regular and even distribution of the concentrated whey on to the rollers and the steam pressure must be controlled to ensure a satisfactory product off the rollers.

If the acidity of the original whey has been excessive, difficulties will be experienced at this stage of the operations. With unsatisfactory whey, the concentrate will form "rolls" off the scraping knife and the finished product will contain pieces of whey rock with fairly high moisture content. Some discoloration will also take place if the finished product "rolls" off the scraping knife.

The whey rock is then usually packed in sacks and stored in a temperature controlled room, a temperature of 60° to 65°F. being maintained to assist with further slight reduction of moisture content.

Grinding to form whey powder

The next operation, the grinding process, will depend on several factors. During the peak months of production in the spring there is not a great demand for whey powder by the cattle food manufacturers. At most creameries during the peak production of milk there is usually a shortage of staff for other duties and it is generally convenient to store the whey rock until there is a reduction in the general manufacturing programme at a creamery. With the fall of throughput during the summer the staff is usually available to commence milling the whey rock.

On the other hand the actual handling involved when the whey rock is stored for several months must be considered. In the first place, the rock is filled into bags, and the weight must be ascertained to obtain the yield and thus check on the efficiency of the creamery in handling the whey, etc. A certain amount of labour and mechanical equipment is required for storing the product at this stage. It follows, therefore, that if there is a demand for whey powder immediately the whey is dried then it is far better to proceed with the milling at an early stage. There is, however, some difficulty in milling the whey immediately off the rollers and in practice it is advisable to store the whey in suitable receptacles for, say, two or three days and then pass the product through a mill.

(Concluded on page 36)

PACKAGING PROGRESS

"Food Manufacture's" Annual Review

That the days of frustrating scarcity in packaging materials are over has been amply demonstrated during the past twelve months when several new materials were introduced, ranging from plastic films to lacquers for containers. Parallel advances were made in packaging machinery and methods, enabling new and better containers to be produced and packaging operations to be accelerated. Our annual review of packaging progress falls into two parts: first there is a description of outstanding materials and machinery introduced during the past twelve months, and secondly there is a pre-view of exhibits at the Packaging Exhibition to be held at Olympia, London, from January 18 to 28.

Developments in 1954

By John A. Buck

MATERIALS

MANY of the new and improved packaging materials now available are the direct result of chemical research. This applies not only to the transparent viscose and thermoplastic films, but also to the lacquers and impregnating agents used to improve the properties of paper and metal containers.

Silicones

Among the newest synthetic products are the silicone polymers, now under development for a variety of uses in packaging. One of the most interesting potential applications is the use of silicones for the internal coating of glass bottles and jars to enable products such as sauces and ketchups to be poured out more easily.

Silicone polymers are highly water-repellent. When applied by spraying and subsequently stoved for about an hour at 300°C., they become thoroughly bonded to the glass. In this condition, they will withstand dry sterilisation and normal cleansing agents, but will not stand up to prolonged treatment with acids or alkalies. A good deal of experimental work along these lines is being carried out, and the first results are reported to be very satisfactory.[1]

The polymers are partly organic and partly inorganic in structure, being derived from carbon and silicon. They can be used for the coating or impregnation of wrapping papers to make them resistant to moisture and non-adherent to sticky products. These papers cannot be printed, but they are useful as lining papers and for other purposes where print is not essential. The flow of materials in food handling plant and weighing machinery can also be improved by coating the equipment with silicone polymers.

Nylon and p.v.c. films

Probably the most significant development of the past few years has been the availability and exploitation of transparent films. Further progress has now been made with the introduction of two entirely new films. One is a film of the nylon (polyamide) type; the other a film of unplasticised polyvinyl chloride.

The nylon film is odourless, non-toxic and entirely free from plasticisers. It is tough and pliable over an exceptionally wide temperature range (−20° to 150°C.), is resistant to both animal and vegetable oils and greases, and will not support mould growth. Available in gauges from 0·001 to 0·020 in., the nylon film is completely waterproof. It does, however, allow the passage of water-vapour, thus preventing condensation or sweating. It can be sealed by high frequency electrothermics, or by adhesives.

The film may be clear or coloured, and can be laminated to a wide range of other materials. It is available in an oriented or "pre-stretched" form, giving a greater tear resistance in the direction of web, *i.e.* 1,200 kg./sq. cm. as against 400 kg./sq. cm. for non-oriented film.[2]

The new polyvinyl chloride film is also an unplasticised material, containing no additives likely to leach out and contaminate food products. It is completely odourless, tasteless and non-toxic. In the past, p.v.c. has normally been plasticised to make it pliable, and the plasticisers have always been liable to leach out when the film was in contact with oils or grease. This made it unsuitable for packaging food products. Now, by producing an unplasticised film, this difficulty has been overcome.

Unplasticised p.v.c. has a rather stiff or rigid feel as compared with most other transparent films. Very thin sections can be sealed by a thermal impulse type of heat sealer, but thicker films must be welded by high frequency electrothermics if a satisfactory joint is to be obtained. The gas per-

Konevale chicken slices are wrapped in a sleeve of " Cellophane " before being canned.

meability factor is very low, suggesting that the film may become valuable for fabrication of vacuum packs, in which it might be used either alone or as a laminate with another type of film such as viscose or cellulose acetate.

Available on reels in thicknesses of from 0·001 to 0·009 in., unplasticised p.v.c. film may be obtained in various colours and opaque shades as well as in the clear transparent form.[2]

Polyvinyl alcohol

Yet another new type of film now available in this country is plasticised polyvinyl alcohol. However, careful tests should be carried out whenever it is proposed to use this film, to ensure that its plasticisers do not leach out and affect the food product.

Polyvinyl alcohol has a soft feel, and is extremely sensitive to water. Some grades dissolve rapidly in hot or cold water, while others dissolve in water at temperatures above 65°C. and remain in solution on cooling. However, the material has an exceptional resistance to grease, oils and most industrial solvents. Although it transmits water vapour at 500 1000 g./sq. metre/24 hr. (for film of the standard 0·003 in. thickness), polyvinyl alcohol is a very good barrier to gases. It is also useful where strength and abrasion resistance are required, providing water resistance is not important. With careful handling, polyvinyl alcohol film may be heat sealed. Although it is rather early yet to attempt to prophesy the future of the material, it is possible that its most useful contribution to food packaging may be as a material for laminating to paper or other films to improve their strength and permeability to gases.

Laminates

Progress has continued in the development and use of laminated materials. During the past year a new cellulose acetate film, coated with a heat-sealing adhesive, was introduced specifically for laminating purposes. The base film before coating is normally 0·002, 0·003 or 0·005 in. thick, and the adhesive coating is approximately 0·0005 in. thick.

The material can be laminated to paper, cardboard, wood and metal by the application of heat and pressure. It will adhere firmly to printed matter, including heavily inked litho work, and is available in sheets 20 in. by 36 in., or in rolls 36 in. wide.

Aluminium

The use of aluminium foil materials for the packaging of soup powders has increased enormously during the past few years. A new aluminium foil laminate has now been introduced, designed especially for dried soups.[3] It consists of a layer of paper sandwiched between two layers of foil. One side of the laminate is coated with a heat-sealing medium, the other side being printed in four colours by the gravure process. The heat-seal coating and the laminants which bond the foil to the paper are highly resistant to moisture and grease, and contribute considerably to the protective value of the pack.

The poor soldering qualities of aluminium continue to hinder its use for the large-scale production of O.T. cans. There are, however, many other ways in which aluminium is being used for food packaging. One new use is for the production of rigid squared-up packs made from a single piece of springy foil. These packs may be hot-filled and may be placed in an oven or beneath a grill by the consumer for re-heating. Packs of this kind have already found favour in the U.S.A. for delicatessen products such as special cheeses, sea foods, fried shrimps, meat loaf and freshly prepared foods for self-service stores.[4]

Aluminium foil is also quite widely used for wrapping butter and margarine. One brand of margarine is being wrapped in paper-backed aluminium foil and enclosed in a printed cardboard outer.

Canning developments

A new use for 6 oz. cans is in the packaging of concentrated quick frozen lemon juice with sugar syrup. It will be interesting to see the reception this receives in this country in view of the phenomenal boom in the popularity of quick frozen concentrated fruit juices in the U.S.A. Another newcomer to the canning industry is canned haggis with, instead of the traditional sheep's paunch, a "skin" of cellulose film. The film is used to make a pouch for containing the haggis, which is then sealed inside the can.[5]

Cellulose film is also being used for wrapping chicken slices in cans. The film, of a non-moisture proof grade, is formed into a sleeve, the slices of chicken placed inside it and the sleeve folded back into the flat-shaped can. This is wrapped with a printed paper label and finally overwrapped with heat-sealed moisture proof cellulose film.

Collapsible tubes

Collapsible tubes have not yet proved very popular in Great Britain for food packaging, though used fairly extensively abroad. A new use for them in this country, announced recently, is in the packaging of Devonshire cream.

In addition to the usual range of tubes made from aluminium, tin, lead and tin-coated lead, collapsible tubes made from plastics such as polythene and polyvinyl chloride are now available. A collapsible tube made from transparent polythene, printed in three colours, is already in production for the packaging of concentrated fruit juices.[6]

Among potential uses that have recently been suggested for collapsible tubes are the packaging of sauces, garnishes, maple and other syrups and individual crop honeys.[7] Another possible use is for the packaging of strong essences such as garlic or onion oils where small nozzles can be fitted to give accurate control.

The use of larger tubes—similar to the industrial type collapsible tubes—may make this form of packaging an economic proposition in cases where it would be uneconomic to pack in smaller tubes.[7]

Rigid plastic containers

New possibilities in the use of rigid plastic containers have been opened up by the recent introduction of machines for forming such containers quickly from thermoplastic sheets. Polystyrene seems likely to prove the most suitable material for food packs as, in addition to being glass clear, it is unaffected by fats or grease. Cellulose acetate may also be suitable in some cases. Although very thin acetate foils are available for food wrapping that have been especially formulated for the purpose, the thicker sheets of acetate normally contain plasticisers which may be harmful to certain foods.

Polystyrene may be used to form very thin yet rigid "throw-away" containers for food products. Containers of this kind, blow-formed from polystyrene sheet and resembling an ice-cream cup in shape, have been used for some time in Greece[8] and in the U.S.A., for the packaging of products such as cream cheese, yoghourt and preserves, as well as for ice cream. In Germany,[9] polystyrene packs have been used for herrings in jelly, salmon in spiced oil and rollmops in dill with cucumber.

The cup-shaped type of pack, in spite of its very thin walls, has ample strength when filled to withstand all normal handling and transport shocks. They can be lidded with slip-over or slip-in lids, or simply covered with a disc of transparent film, printed paper or metallic foil.

Almost any size or shape of container, within reasonable limits, can now be produced from thermoplastic sheets. They can be entirely transparent throughout, or alternatively, can have coloured translucent bases with glass-clear lids. Thicker gauges of polythene sheet can also be used for making opaque or semi-translucent containers of this kind.

Improved printing techniques for thermoplastic and viscose materials have enabled a greater range of multi-coloured print to be used. Exceptionally brilliant six-colour printing on viscose film was introduced recently for the overwrapping of deep-freeze vegetables. It is also being used for the wrapping of biscuits and similar goods.

In some cases, particularly for sachets containing transparent liquids, interesting effects can be achieved by printing on both the inside and outside of the film. Where this idea is used for food products, however, it may be necessary to have an additional unprinted inner film lining to prevent the food from coming into contact with the printing ink.

Plastic coatings

A new packaging material especially designed for quick frozen foods consists of paper coated on one side with polythene and on the other with wax. This gives an exceptionally high degree of moisture and grease resistance, but is cheaper than coating both sides of the paper with polythene.[10]

An interesting development now under investigation is the use of polythene for the coating of hessian. Successful results have been achieved with polythene coatings of about 0·003 in. thickness; it has so far been difficult to obtain satisfactory bonds on the hessian with coatings of lesser thicknesses.[10]

Another possible development is the use of a plain or crêped Kraft paper laminated to hessian with a standard type of adhesive, polythene being subsequently applied to the surface of the paper. Although the investigation of polythene-coated fabrics is still in its early stages, experimental work has shown that these materials have a promising future.

Plywood and fibreboard

The use of plywood boxes for bulk packaging has frequently been impossible for some manufacturers who lack the necessary storage space for such bulky containers. This problem has been simplified by the introduction of a new returnable collapsible plywood case which can rapidly be assembled with the aid of a variety of fastening devices, including staples, leather straps, toggle clips or tensional steel or wire strapping.

For manufacturers who prefer to use one-trip fibreboard cases for the bulk transport of canned and other foods, a new tear-strip device has been evolved to simplify the opening of the case. It consists of a pressure-sensitive high tensile cotton tape applied by the makers of the case to the inside of

the carton blank. An "H" shaped slot is cut in the case wall, providing an easily lifted "lift-and-pull" tab on the outside of the container.

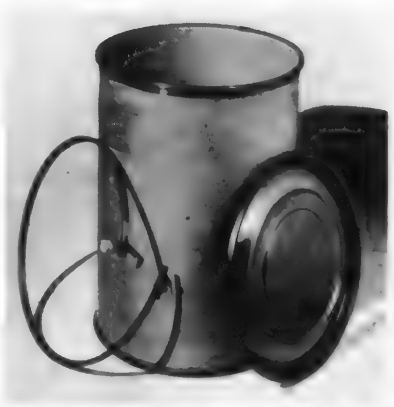
MACHINERY

Trends in packaging machinery are now generally towards the development of machines which are adaptable to handle a wider range of sizes and shapes of container than hitherto. This is of special significance to the smaller food manufacturer producing a relatively wide range of products and needing one or two machines capable of performing a variety of functions. For the larger manufacturer producing a continuous flow of highly standardised lines, single-purpose machinery is still the most economic in operation and loss of adaptability is not so important as the increased functional efficiency which single-purpose machinery should provide.

Waxed-cup plant

An example of adaptability in packaging machinery is a new waxed-cup making plant which will produce cups in sizes ranging from 2½ oz. to 25 oz. The cups are suitable for jam, ice cream and hot or cold liquids. The complete plant consists of three machines. The first punches and prints in two colours the blanks for the cup walls. The second is a two-piece cup making machine which forms the cups from the previously produced blanks and fits the bases, which it punches out from a roll of board. This machine delivers the cups complete with rolled rim and recessed base at a rate of up to 75/min., according to size. The third machine sprays wax on to the cups as they pass through a misting chamber.[11]

Of interest to the canning industry is a new general line body-maker which can produce between 45 and 60 can bodies/min. Round, square or irregular shaped cans can be made on this machine which will deal with sizes from 2 in. to 4½ in. diameter with a maximum body length of 8 in. A special version of the machine can be obtained for smaller diameters down to 1½ in.[12]



Bowaters' "Supakask," a new fibre drum with steel lid and locking band closure. Note the steel beading and rolling chime.

For overwrapping trays and cartons, a new machine is available giving outputs varying from 40 to 80/min., with two operators. It will handle film, waxed or plain paper, glassine and waxed foil. A heat-sealing unit or gumming attachment can be incorporated and the machine can be adjusted to a wide range of sizes by means of change parts.

Filling and capping

Vacuum assisted machines have proved invaluable for filling jars and tins with difficult materials such as semi-liquids and pastes. One of the latest machines of this type is capable of an output of up to 50/min. with only one operator. By changing the filling nozzles products of varying viscosities can be handled. A special version of the machine is available equipped with a hot water jacket and scraper blade to prevent the drying and burning of cheese spreads and similar products.

The crowning of bottles may be achieved at a speed of up to 750 dozen/hr. on another new machine. It is designed to take odd-shaped bottles without difficulty and the six heads will crown both tall and short bottles with exactly the same pressure within 1½ in. variation of height.

A new labelling device for manufacturers whose needs do not justify entirely automatic plant will deliver labels moistened and ready for application as fast as the operator can use them. Operated by foot pedal, the machine will accommodate 1,000 or more labels at a time.[13]

Machines which automatically weigh and deliver the food product through a chute into a bag held by the operator are useful for packaging a variety of products. One of the latest machines of this type is able to deal with many difficult products, including butter beans, cereals, shredded suet, potato crisps, dried fruits and many others. It is adjustable for weights from 2 to 16 oz. and is a vibrator feed type of machine with output speeds of from 18 to 24/min. Change of weight is effected by simply changing the standard weights in the weight cradle.

For the feeding, filling and sealing of small envelopes an entirely automatic machine has been developed giving outputs of 60 to 70/min. Either gummed or heat-sealable bags may be used. A screw-volume device is incorporated enabling the machine to be accurately adjusted for weights up to 2 oz. of the lighter powders, such as custard and blancmange powder, and 4 oz. for the heavier varieties of powder such as jelly crystals and gelatines. Another version of the same machine has been designed for handling tablets and capsules. It is fitted with a counter mechanism by which the number of tablets fed to each envelope can be controlled and adjusted.

Plastic forming machines

A number of interesting machines have been introduced during the past year for the forming of lightweight containers from thermoplastic sheet. One of them will form and seal round containers up to 7 in. by 1¼ in. deep or rectangular containers up to 8 in. by 4 in. Materials suitable for use with this machine include unplasticised p.v.c. and polystyrene foil.

Another machine will form

almost any shape of straight-wall or nesting container from almost any thermoplastic sheet, within a reasonable range of thicknesses. Yet another machine is available for the vacuum deep-drawing and forming of thermoplastic sheets, having a moulding area of 24 in. by 36 in. and a depth of draw of up to 6½ in. Where small containers are required, several can be produced simultaneously from the same sheet. The time required to heat and form the sheet varies from 8 to 14 sec. per 0·01 in. thickness. Moulds for this machine can be produced quickly and cheaply from low-cost materials such as plaster, wood and cast resin. This means that short runs of many different sizes and shapes of container, which would not justify the cost of precision steel injection moulds, can now be produced.

Printing machines

For printing on transparent films, the aniline method—featuring the use of rubber stereos—is widely employed. The process is particularly suitable where food products are concerned since aniline inks, being highly volatile, leave no objectionable odour as do the inks based on drying oils that are used for general letterpress printing.

Two new machines for aniline printing are of interest. One of these is likely to be of special value for printing small batches of materials as and when required, or for the overprinting of additional matter on ready-printed materials. Besides printing transparent films, it will also handle materials up to ½ in. thick, thin tissues and glassines. It is a single colour machine capable of dealing with sheets up to 20 in. by 60 in. at speeds of 2,000 to 2,500 per hour.

The other new aniline printer is primarily a two-colour model, but can be adapted for printing in three or four colours by the addition of extra printing heads. Printing can be carried out on both sides of the film if desired, by reversing the colour units, enabling any colour to be used for print on either the inside or outside of the film.

Each colour can be adjusted laterally and along the length of the printed web while the machine is running, enabling perfect colour registration to be achieved. Between the colours, hot air jets are fitted to dry the inks, and before the film leaves the machine a final drying is done by a heated roller, the temperature of which can be easily controlled.

REFERENCES

1. *Packaging*, 1954, **36** (282), 11.
2. *Ibid.*, 1954, **36** (283), 55.
3. *Ibid.*, 1954, **36** (284), 62.
4. *Ibid.*, 1954, **36** (288), 48.
5. *Ibid.*, 1954, **36** (292), 41.
6. *Packaging Review*, 1954, **74** (93), 29.
7. *Packaging*, 1954, **36** (288), 40.
8. *Ibid.*, 1954, **36** (289), 57.
9. *Ibid.*, 1954, **36** (290), 50.
10. Ridley, C. N., *Packaging Review*, 1954, **74** (93), 24.
11. *Ibid.*, 1954, **74** (91), 39.
12. *Canning and Packing*, 1954, **24** (279), 11.
13. *Ibid.*, 1954, **24** (286), 11.

Better Packaging with New Materials and Machinery

Food manufacturers can now choose from a wider and better range of packaging materials, containers and machinery than ever before. Although perhaps the most spectacular development has been shown in plastics, progress has been made in the more traditional materials such as metal, paper, fibreboard and even stoneware. Adhesives have also been improved. Machinery manufacturers have not slackened the pace of their development and great ingenuity has been employed to improve equipment for filling, capping, labelling, cartoning, bag forming, bottle cleaning, metal detection, etc. Progress in all these branches of packaging can be seen at the Fourth National Packaging Exhibition at Olympia, London, from January 18 to 28. Here is an up-to-date guide to outstanding displays.

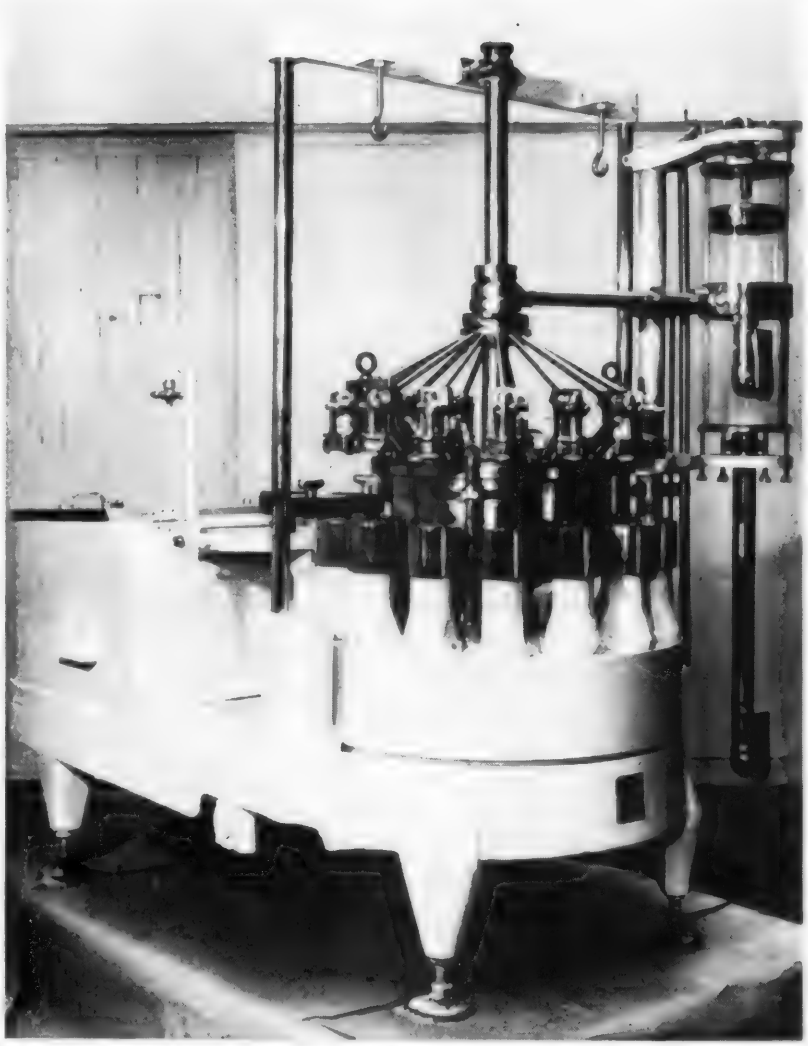
ADHESIVES

Arabol Manufacturing Co. Ltd. (Stand 8, Row K, Ground Floor, National Hall)

Adhesives for all packaging purposes will be displayed on this stand, together with speciality adhesives for use on tin, waxed and treated papers, foils, moistureproof film and plastic materials. Cold glues, gums and pastes, dextrines, animal glues, synthetic resin glues and emulsions, heat seal coating adhesives, liquid rubber latex and latex compounds, waterproof glues and rubber solutions, will also be shown. Among the other exhibits will be self-adhesive cellulose, acetate, p.v.c., polythene, vinyl plastic, ethyl cellulose, cloth and waterproof fabric tapes for tropical packaging, airtight sealing and decorative packaging.

Feculose Co. Ltd. (Stand 1, Row K, Ground Floor, National Hall)

A new adhesive for the labelling of silicone-treated containers will be introduced by this company. This adhesive, which is a machine glue, is expected to be of interest and importance to container manufacturers in this field as, hitherto, it has not been possible to label these containers efficiently owing to the tendency of the silicone treatment to affect the external as well as the internal area. Many other industrial adhesives in liquid and powdered form will also be shown on this stand by a display of specimens contributed by manufacturers who use them in production. These specimens will illustrate the use of animal and casein glues, flour and starch pastes, gums and heat sealing adhesives, rubber latex adhesives, synthetic resin adhesives and wax adhesives.



Albro fully automatic vacuum-operated rotary filling machine for thick or thin products. The parts of this machine that come into contact with the product are manufactured of stainless steel.

Gloy and Empire Adhesives Ltd. (Stand 2, Row K, Ground Floor, National Hall)

This company's exhibit will be made up of a display of various types of adhesives, coupled with consumer packs upon which such adhesives are normally used.

J. Gosheron and Co. Ltd. (Stand 3, Row B, Ground Floor, National Hall)

Self-adhesive tapes on film, cloth and paper bases to Ministry of Supply, Air Ministry, Admiralty, American Services and British Standards specifications will be exhibited on this stand. The *Filmic* range will include cellulose, p.v.c., ethyl cellulose, polythene, vinyl and cellulose acetate tapes for sealing, protecting, masking, export and Services packing. Ordinary and waterproof cloth tapes for sealing, masking, protecting, export and Services packing, paper tapes for masking and protection and single and double ply printed tapes in a wide range of colours on various filmic tapes for branding, routeing, marking, instructing, labelling, advertising, coding and point-of-sale appeal will be shown.

Industrial Tapes Ltd. (Stand 6, Row S, Ground Floor, Empire Hall)

This company will be exhibiting its full range of 26 products, including self-adhesive tapes, which range from filmic materials to waterproof cloth tapes in six colours. The latest additions to the company's range of self-adhesive tapes include cloth and paper tapes coated with adhesive on both sides, glass fibre tape coated with a self-adhesive mass, and a self-adhesive tape which can be written upon with either pen or pencil.

Johnson and Johnson (Gt. Britain) Ltd. (Stand 9, Row H, Ground Floor, National Hall)

Permacel cellulose self-adhesive tapes, which are available transparent and in 10 colours, and the new waterproof p.v.c. unplasticised, which is transparent only, will be shown on this stand. *Permacel* cloth self-adhesive tapes, cloth and crêpe paper masking tapes and printed tapes will also be exhibited. A feature of this stand will be a working demonstration of the new 2-in. corner sealer. A pre-determined length dispenser will also be shown.

Samuel Jones and Co. Ltd. (Stand 6, Rows B and C, Ground Floor, National Hall)

The exhibits on this stand will illustrate the choice of the correct grade of adhesive and plain label paper for automatic labelling machines, the most suitable gummed label paper and the *Lightning* labeller for hand labelling, and thermoplastic labelling by the range of *Imatac* and *Delatac* heat-fix papers produced for the high-speed fully and semi-automatic labelling machines and also for hand labelling. Pressure sensitive labels from the firm's tacky label and split back label paper ranges will also be exhibited. The prototype of the company's new electric labelling machine, designed for use with pre-gummed labels, and a new hot plate for heat-fix labelling will also be featured on this stand. In addition to a full display of the whole range of the firm's products, four sealing machines will be demonstrated.

National Adhesives Ltd. (Stand 7, Row R, Ground Floor, Empire Hall)

A wide range of adhesives, resins, dextrines and starches will be shown on this stand. The company's range includes products for the manufacture of all types of containers, and for sealing, wrapping and labelling the filled package. Special attention has been given to the newer packaging materials, the need for higher production speeds and consideration of end-use conditions, including export to extreme climates and refrigeration. A variety of special packs will be on show and technical advice will be available.

CONTAINERS

Betts and Co. Ltd. (Stand 7, Rows B and C, Ground Floor, Empire Hall)

An extensive range of non-ferrous containers and bottle capsules will be displayed, including collapsible metal tubes made of pure tin, lead, aluminium and tin-coated lead; rigid containers made of extruded aluminium in a wide range of sizes, as supplied to manufacturing chemists, etc., for tablet and pill containers; bottle capsules manufactured in tin coated lead, aluminium, pleated aluminium and aluminium foil; metal coils manufactured in pure tin, lead and alloys of tin, lead and zinc, as supplied to the electrical and confectionery trades; and new aluminium containers, formerly known as "Turnerstyle" and now known as "cassets."

Machinery for the application of bottle caps to bottles will also be shown.

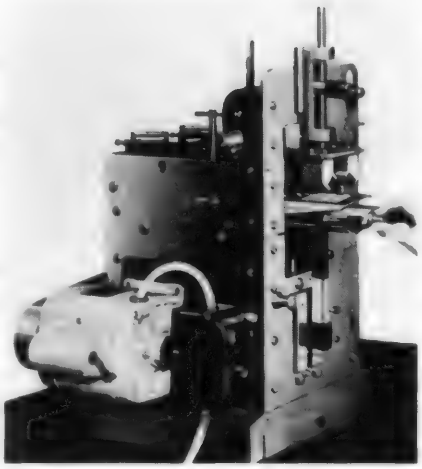
Bowater Sales Co. Ltd. (Stand 8, Row S, Ground Floor, Empire Hall)

The theme of this stand will be "Development" and many new and improved products will be displayed. A new fibre drum and a new tear-strip corrugated case will be featured, together with the latest refinements in multiwall sack design, new bags and many colourful and protective wrappers.

There will also be the first public showing of the Bowater range of sack weighing, filling and closing equipment. The new fibre drum, known as the *Supakask*, has a smooth, tight-fitting steel lid and locking band, a waterproof recessed base and a steel rolling chime. The first tear-strip corrugated case to be manufactured in this country has the advantage of ease of opening, thus eliminating the risk of damage to contents.

John Dale Ltd. (Stand 8, Rows D and E, Ground Floor, National Hall)

Metal boxes in tinplate and aluminium, a wide range of plastic closures, many of which are used in the food industry, and collapsible tubes will be exhibited on this stand. Among the collapsible tube exhibits will be two new developments: firstly, aluminium tubes internally coated with a continuous film of polythene approximately 0·004-in. thick, and secondly, collapsible tubes with an internal application of latex at the open end to enable the tube to be heat sealed after filling.



The "Newman" semi-automatic labelling machine, model 23A, exhibited by D. Trapow and Co.

John Dickinson and Co. Ltd. (Stand 6, Rows F and G, Ground Floor, National Hall)

This company will be displaying a full range of its packaging products, the latest of which is a range of pocket envelopes suitable for high-speed automatic filling, brightly printed for counter appeal and having special corners designed to prevent leakage of powder. The firm has also produced a new, specially partitioned carton which makes for safer transit and easier handling of its own products.

John Feaver Ltd. (Stand 26, Outer Row, First Floor, National Hall)

A wide range of tinplate containers, many of which are of interest to the food manufacturer, will again be exhibited by this firm. The display will include a comprehensive range of slip cover tins, in plain colours or fully lithographed, cans for packing hams, chickens, brisket and other preserves, synthetic creams, flour and preserved provisions, and kegs, drums and tapers for fats, oils and essences.

Fibrenyle Ltd. (Stand 18, Centre Row, First Floor, National Hall)

A wide range of polythene bottles and jars in capacities from 1 oz. to 13 gal., with many kinds of fitments such as puffers, atomisers and pourers, will be displayed on this stand. The range will cover toilet, medical and heavy chemicals applications.

London Aluminium (Containers) Ltd. (Stand 12, Centre Row, First Floor, National Hall)

A range of different styles of seamless aluminium containers for aerosols and pressurised packs will be exhibited. The company also offers its whole range of containers internally coated with the latest types of epoxy resin-based lacquers which show a high degree of chemical resistance.

Medway Corrugated Paper Co. Ltd. (Stand 1, Rows B and C, Ground Floor, National Hall)

A range of this company's various types of corrugated cases, paper and tubes, showing the different types of inner fittings, will be exhibited on this stand.

Metal Box Co. Ltd. (Stand 6, Rows H and J, Ground Floor, National Hall)

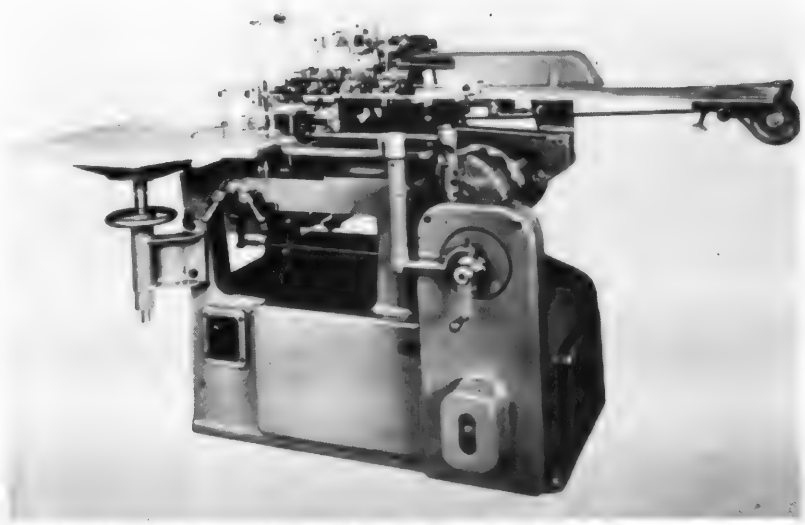
This stand will show a wide range of packages and packaging materials and will give special prominence to the company's services, which include the provision and maintenance of closing machinery, design services, research services and marketing advice and intelligence. *Diothene*, the company's new polythene film, aerosol dispensers and a selection of some of the company's newest closing machines will also be exhibited. In addition, aerosol containers made from aluminium and tinplate, together with three types of valve, will also be shown.

Midland Aerosols Ltd. (Stand 12, Centre Row, First Floor, National Hall)

This company will show a range of pressurised packs covering a wide variety of products packed by the firm's American associates, Connecticut Chemical Research Corporation. Two new developments, namely the plastic coated glass bottle and the miniature aerosol, will also be displayed.

Reads Ltd. (Stand 4, Row B, Ground Floor, National Hall)

This company's exhibit will comprise a range of tin boxes and steel, aluminium, and lined drums and other metal containers widely used in the chemical industry. Some of the special closures being shown are *FlexSpout* plastic necks, *RingSeal* tamper-proof fittings and *ViseGrip* pressed-steel and aluminium bungs. Of particular interest is the recently developed "Vacuum Pack Drum" designed for vacuumising the container after filling, and for the subse-



Sapal type PRLP chocolate bar and novelty foiling and wrapping machine exhibited by Bramigk and Co.

quent insertion of an inert gas if required. Various methods of surface protection in painted and stoved finishes, internal lacquers and linings and external lithographing of many designs will also be shown.

R. P. Scherer Ltd. (Stand 4, Centre Row, First Floor, National Hall)

Although manufacturers of gelatin capsules primarily for the pharmaceutical industry, this company, which will be exhibiting for the first time at the Packaging Exhibition, is now extending its service to other industries and will therefore be showing the capsule as a packaging unit adaptable for a wide range of products. The stand will show examples of rotary die gelatin capsules at present in use in industry and new ideas for the future use of these capsules. The company is building a new factory for the high-speed manufacture of rotary die gelatin capsules and its services will comprise either the encapsulation of customers' materials or the complete manufacture of capsules to customers' formulæ.

Thames Board Mills Ltd. (Stand 12, Inner Row, First Floor, National Hall)

Cartons and boxes made from Thames Board and various types of *Fiberite* packing cases in solid and corrugated fibreboard will be shown on this stand. Specimens on view will illustrate how special fitments and protecting pads are designed to carry fragile articles, both for home and export trade.

The Thompson and Norris Mfg. Co. Ltd. (Stand 8, Centre Row, First Floor, National Hall)

Corrugated fibreboard containers designed to meet the specific requirements of a wide range of industries will be displayed. Of particular interest will be a coloured corrugated fibreboard with a linen grain finish recently developed by the company. This finish greatly enhances the appearance of corrugated fibreboard and is available in many colours. The *Kraftexa* weatherproof cases which were first introduced by this company and used extensively on the successful 1953 Everest Expedition will form a special feature. Finally, the latest of corrugated fibreboard merchandising units in the form of floor display stands will be shown.

Venesta Ltd. (Stand 9, Row B, Ground Floor, National Hall)

A comprehensive display of this company's products, ranging from foil, collapsible metal tubes and rigid aluminium containers for individual packaging, to drums, barrels and cases for bulk packaging, will be exhibited. Technical sales representatives of the company will be present to discuss the application of these forms of packaging to individual needs, including the special coating of foil and internal lacquering of collapsible tubes to suit various contents. A new fibre drum, which can be supplied, where necessary, with a moistureproof barrier of aluminium foil incorporated in the body wall, will also be on show.

MACHINERY AND EQUIPMENT

Albro Fillers and Engineering Co. Ltd. (Stand 8, Rows H and J, Ground Floor, National Hall)

The following machines will be shown on this stand: a range of *Albro* vacuum-operated valveless filling machines for thick and thin liquids; vacuum-operated dustless powder filling machines, single- and double-head type; weight-operated filling machines for oils, paints, spirits, etc.; volumetric type fillers for creams or pastes, etc.; fully automatic capping machine for handling metal or plastic caps at speeds up to 120/min.; a machine for knocking stopper corks into various sizes of bottles; fully automatic vacuum-operated powder filling machine; the latest *Albro* C.T. 15, low vacuum-operated filling machine for wines, spirits and a wide range of other liquids; and the new G.V. 61 model for filling and aluminium capping fruit juice bottles. Technical staff will be present to demonstrate and discuss any filling or packing problems.

Alite Machines Ltd. (Stand 8, Inner Row, First Floor, National Hall)

Powder handling plant for chemical, cosmetic and allied industries will be exhibited on this stand. The company's latest machine, the double conical mixer, will also be shown.

Autopack Ltd. (Stand 2, Row T, Ground Floor, Empire Hall)

A completely automatic plant for feeding, filling and sealing envelopes or bags at a speed of 60 to 70/min. will be featured on this stand. The machine handles any size envelope from 1½-in × 1¾-in up to 4½-in. × 6-in., and the *Autopack* filling heads are capable of filling with maximum accuracy quantities of up to 2 oz. of light powders, such as tea, custard, and blancmange, and up to 4 oz. of denser powders such as jelly crystals and gelatin. Another item of interest of this stand will be a double beam high speed tea weighing machine.

Auto Wrappers (Norwich) Ltd. (Stand 2, Row A, Ground Floor, National Hall)

A representative selection of the company's range of packaging and wrapping machines will include two new machines. The "Blanchet" butter moulding and wrapping machine, which is claimed to be more advanced than any other machine of

its type, produces 26 lb. of wrapped butter per minute and, by means of substitution parts, ½ lb. and ¼ lb. wrappings can be produced. The "WLL" fully automatic machine for wrapping loose biscuits direct into cellulose film, waxed paper, "fiberfoil" or similar materials is readily adaptable for wrapping further sizes from the original by fitting change-over parts. A modified version of this machine, which has an output of 40 min., is suitable for wrapping large cartons into any normal heat sealing medium.

Bramigk and Co. Ltd. (Stand 4, Outer Row, First Floor, National Hall)

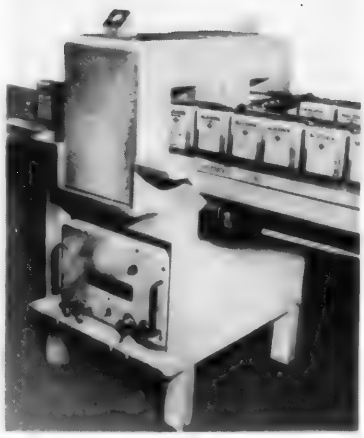
Two machines of Swiss manufacture will be on view here. The type PRLP chocolate bar and novelty wrapper, specially designed to imitate skilled hand wrapping work, handles a wide range of shapes and sizes and is easily changed over from one job to another. The type BN-e enclosed mechanism machine foils and wraps bar goods between the sizes of 80 × 40 × 12 mm. and 36 × 20 × 20 × 4 mm. at a speed of 140 to 160 pieces/min.

Caleb Duckworth Ltd. (Stand 4, Row S, Ground Floor, Empire Hall)

This stand will feature the company's 2M "Conical" Fruit Cleaner for cleaning currants and sultanas. This machine breaks up the fruit from the solid mass and automatically feeds it into the cleaner at the correct speed. It extracts stalks, grubs, general dirt and nails or other ferrous objects and delivers the fruit undamaged, cleaned and retaining its original bloom. Two filling machines particularly designed for jams, marmalade, jellies, soups and similar products into containers of any size from 2 oz. up to 7 lb. with great accuracy and cleanliness will also be shown. Other exhibits will include a table model mincemeat filler, which has a single pump action; the "Colunio" factory can opener, which magnetically withdraws the lid after cleanly cutting it out; the "Colunio" jar cleaner and polisher; and two small devices for lifting and carrying 28-lb. tins and 7-lb. jars of jam.

Cinema-Television Ltd. (Stand 7, Centre Row, First Floor, National Hall)

The company's new Mk. IV industrial electronic metal detector will be demonstrated for the first time at this exhibition. New features of the equipment include increased sensitivity to all metals, equal sensitivity to all metals, simpler construction, reduced size, easier installation and a number of technical improvements. Also demonstrated will be a working selection of typical ejection systems in current use in industry for removing a contaminated article from the conveyor line without production hold-ups.



An electronic metal detection machine by Goring Kerr Ltd. covering Glucodin at Glaxo Laboratories Ltd., Greenford.

Dapag (1943) Ltd. (Stand 5, Row C, Ground Floor, National Hall)

Machines for overprinting labels, tickets, tags and cartons will be displayed on this stand. Among them will be the Imprima V printing machine, which is a new model superseding the old Imprima D2C.

Job Day and Sons Ltd. (Stand 1, Row T, Ground Floor, Empire Hall)

This company will be exhibiting two models, one a standard type R.M. tea packer of the latest design, and the other a packer section of the company's type L.C.P. lined carton packer. The tea packer is the latest Mark III model, suitable for packing tea into lined paper packets, sealed on one side and two ends by means of a band label. It is fed from twin reels of paper and pre-cut labels and works in conjunction with electric weighing machines.

Fords (Finsbury) Ltd. (Stand 2, Row D, Ground Floor, National Hall)

A range of fully automatic and semi-automatic machines for aluminium capping, including fast-running cap-making presses, vial and bottle cap-applying machines, and cap-spinning machines will be on show. A recent development which will be featured on this stand is a semi-automatic spinner for aerosol bottles.

Hansella Machinery and Packaging Ltd. (Stand 7, Row S, Ground Floor, Empire Hall)

Two "Transwrap, type 125A" automatic bag forming, filling and sealing machines will be shown, one filling liquid hair shampoo into *Fin Seal* packages and one filling wrapped confectionery into *Pillow* packages. Both machines are of identical basic type and can be supplied with various devices to handle solid, granular, powdered, liquid or semi-liquid products by volume, weight or count.

Thomas Hill Engineering Co. (Hull) Ltd. (Stand 7, Row Q, Ground Floor, Empire Hall)

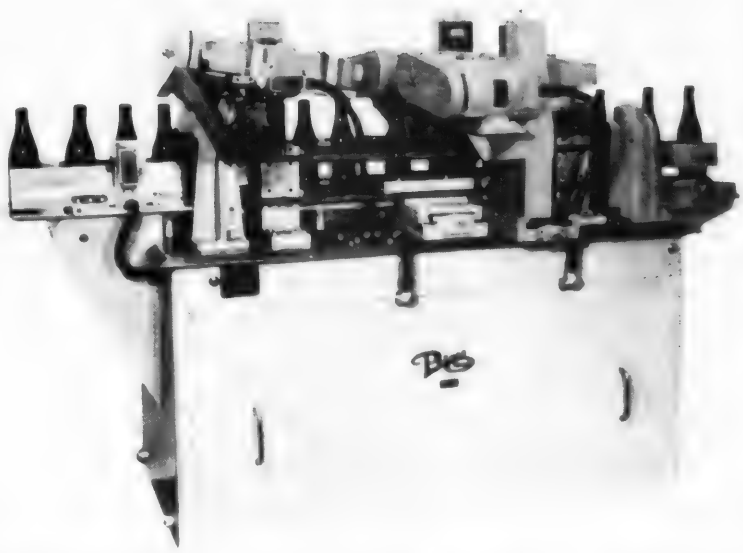
This company's display will include several machines not previously shown at the Packaging Exhibition. They include the Fig. 420 "Speke" (Mark II) fully automatic, single-line, vial cleaning machine, and the Fig. 426 ampoule rinsing machine, which rinses 48 ampoules at a time. All machinery on this stand will be operated and demonstrated continuously during the exhibition.

Goring Kerr Ltd. (Stand 4, Row N, Ground Floor, National Hall)

Electronic metal detection equipment for the location and rejection of particles of tramp ferrous and non-ferrous metals in foodstuffs will be shown on this stand. The Mark 7 model, capable of detecting particles of ferrous and non-ferrous metals less than one milligram in weight, will be shown for the first time.

Loma Electronic Equipment Ltd. (Stand 14, Inner Row, First Floor, National Hall)

This company will be exhibiting its latest *Metaltector* metal detection equipment. The product to be inspected is passed through an aperture in the detecting head and when a small metal particle enters the aperture the control unit reacts and operates a control relay to give visual and audible warning, stop the conveyor band, and/or drop a marker on to the band. The position of the offending metal is thus localised and it can be removed by hand or diverted. Special ejection systems can be fitted so that contaminated products can be diverted without stopping production.



This fully automatic bottle de-stoppering machine exhibited by G. D. Peters and Co. Ltd. is capable of removing screw stoppers from standard pint bottles at speeds up to 1,500 doz. hr.

Machinery (Continental) Ltd. (Stand 7, Row D, Ground Floor, National Hall)

Machines for filling tablets, powders and liquids into heat sealing film materials will be exhibited on this stand.

An operation likely to appeal to biscuit manufacturers is the wrapping of round biscuits without skillets.

A machine for forming and glueing skillets will also be shown. Among other exhibits will be a range of *Ciliotta* labelling machines and a series of semi-automatic wrapping machines and sealing machines. Among these will be the *Futura* semi-automatic wrapper, which can deal with a wide range of packages without changing the tooling.

Medway Paper Sacks Ltd. (Stand 4, Rows F and G, Ground Floor, National Hall)

In addition to producing sack-filling and sack-sealing equipment, this company has now developed a sack-flattening machine which will be exhibited for the first time. By reducing aeration in the packaging of bagged products and by ensuring that the minimum size sack is used for any given material, the Medway *Sac-Flattener* has, it is claimed, proved itself capable of saving up to 20% in stacking and storage space. A wide range of multi-wall paper sacks will also be exhibited.

Metal Closures Ltd. (Stand 5, Rows H and J, Ground Floor, National Hall)

A demonstration of application of "R.O." and "Pilferproof" closures by the following range of machines covering all production requirements from 12 to 135 bottles/min. will be staged: Type H.S. hand-operated, hand-fed machine, capacity of 12-15 bottles/min.; type I.S. power-operated, hand-fed machine, capacity of up to 30 bottles/min.; type A.C. single-head, fully automatic machine, with hopper cap-feed, capacity up to 60 bottles/min.; and type R.B. five-head, fully automatic machine, with hopper cap-feed, capacity up to 135 bottles/min.

Morgan Fairest Ltd. (Stand 3, Row A, Ground Floor, National Hall)

The exhibits on this stand will include a completely new labelling machine, designed for the combined application of body and neck labels to cylindrical containers and also for some types of shaped bottles, jars, etc. This machine employs the basic principle of the "Banks" labelling machine and will operate at varied output speeds up to a maximum of 120/min.

G. D. Peters and Co. Ltd. (Stand 4, Row L, Ground Floor, National Hall)

Among the exhibits on this stand will be the "Pony Labelrite Labelling Machine" which has not been shown by this company before. Capable of performing a great diversity of labelling operations, this machine can be easily adapted into any production line for automatic or semi-automatic working. Depending on the bulk of the container, hand-labelling speeds vary from 35 to 60/min., and when used automatically this output can be at least doubled. Special parts or attachments are available for labelling two, three or four pieces simultaneously.

Purdy Machinery Co. Ltd. (Stand 7, Inner Row, First Floor, National Hall)

The labelling machines on show here will include the *Linamatic* labelling machine for single- or multi-labelling work on front and back simultaneously, the *Unimatic* labelling machine for front labelling only but including all-round neck bands, the "New Way Labeller" for all-round labelling of cylindrical containers, and the *Universal* semi-automatic labelling machine.

Russell Constructions Ltd. (Stand 1, Row O, Ground Floor, Empire Hall)

One of the most prominent exhibits on this stand will be the Russell Separator with submerged mesh. In this machine the straining operation takes place through a screen submerged in the liquid, and one of its most effective applications is for straining out sand and bag fluff from sugar water. The static underpan is constructed to maintain a predetermined level of liquid before this liquid can emerge from the filtrate outlet. The opposite end of the static pan to the filtrate outlets forms a gentle slope. The vibrating mesh frame is supported within the static underpan in such a way that the liquid level is maintained about 1 in. above the mesh surface. The reject material is removed by a travelling brush which sweeps it up the slope at the end of the mesh frame and thence to the reject outlet. The standard range of Russell sieving and straining equipment will also be shown.

Sauven Perforating Machine Co. (Stand 22, Inner Row, First Floor, National Hall)

A number of hand, treadle and power operated machines for dating and coding labels, cartons, wrappers, etc., together with *Codedge* label and carton coding machines, will be

shown on this stand. The *Codedge* junior (Model No. 2), an entirely new machine, will be exhibited for the first time. Capable of coding all shapes and sizes of labels at the rate of up to 2,000 labels min., this machine is portable and operates with a ¼ h.p. motor.

D. Trapow and Co. Ltd. (Stand 3, Rows F and G, Ground Floor, National Hall)

Labelling machines and appliances, gumming and cap wadding machines and appliances will be displayed on this stand. Among the exhibits will be the Newman self-feeding gumming machine, model 1D, which fully gums and delivers labels from a pack ready for application by hand. Delivery of labels is controlled by a finger touch bar at the front of the machine. Capable of accommodating without additional fittings most labels from approximately 1½-in. to 6-in. × 6-in., the machine will deliver up to 120 labels / min.

MATERIALS

Anglo-American Plastics Ltd. (Stand 5, Outer Row, First Floor, National Hall)

With its associate company, Commercial Plastics Ltd., this firm will be showing plain and gussetted polythene layflat tubing in standard widths from 2-in. to 36-in. and thicknesses from 0·0015-in. to 0·005-in. for conversion into bags, envelopes, drum and case linings. Examples will be on view of various packs using the following materials: *Fablothene* printable polythene; printed and unprinted polythene bags, envelopes, drum and case linings, and polythene sheet film; *Fablon* p.v.c. film to B.S. 1763 for wrappings and conversion into bags, envelopes, drum and case liners; laminated p.v.c. film, for drum and case liners, etc., available in special formulations for specific applications; and p.v.c. coated papers and fabrics.

British Celanese Ltd. (Stand 9, Row D, Ground Floor, National Hall)

The display on this stand will mainly feature *Cellastine*, a new acetate wrapping film, and *Clarifoil*, an acetate film for laminations and window cartons. *Cellastine* is said to give complete protection against contamination and, being greaseproof, is ideal for the packaging of sausages, bacon, meat pies, etc. It has a good surface for multi-colour printing by gravure and aniline methods.

British Cellophane Ltd. (Stand 2, Row P, Ground Floor, Empire Hall)

Several important developments in the work of this company will be featured on its stand. The company's chief product, *Cellophane* cellulose film, will be prominently featured with examples of its many applications in packaging fields both in the U.K. and overseas. An important development in B.C.L. polythene film has been made this year with the introduction of "K" polythene film, a material which has a good printing surface as well as the many protective qualities of the film, such as toughness, moisture-proofness, resistance to chemicals, flexibility and purity. As selling agents for Courtaulds' cellulose acetate film, the company will also exhibit examples of this material in use, particularly in the field of rigid transparent decorative packs. A newcomer to the company's range of materials, unplasticised p.v.c. film, which has uses in packaging and in electrical insulation, tape manufacture and laminations, will also be featured on this stand. Examples of printed rolls, sheets and bags, manufactured by Colodense Ltd., a wholly owned subsidiary of British Cellophane Ltd., will also be exhibited.

BX Plastics Ltd. (Stand 13, Centre Row, First Floor, National Hall)

Thermoplastic materials covering almost the entire field of packaging, ranging from heavy duty drum liners to display packs for the more exclusive type of confectionery products will be displayed by this company. *Bextrene* polystyrene moulding powder will be shown in granule form and also moulded into containers. The company's various materials will be displayed made up into bags, wrappers, sachets and drum-liners and a machine will demonstrate the heat-sealing of BX polythene layflat tube.

Evan Cook's Packers Ltd. (Stand 6, Row D, Ground Floor, National Hall)

This company, which specialises in export packing, will exhibit packaging techniques, adjustable conveyors, and inexpensive packaging aids. Photographs of export packing of machinery, machine tools, agricultural machinery, china and glass and packing case designs to commercial and government specification will also be shown.

Telegraph Construction and Maintenance Co. Ltd. (Stand 3, Row R, Ground Floor, Empire Hall)

A display of *Telcothene* coated paper emphasising the potentialities of this material as a packaging medium will be featured on this stand. *Telcon* metal foil laminate, which comprises a lamination of kraft paper, aluminium foil and *Telcothene*, and is designed for the packaging and storage of Service equipment under tropical conditions, will also be on show.

Transparent Paper Ltd. (Stand 8, Row R, Ground Floor, Empire Hall)

A display of multi-colour printed *Diophane* cellulose film—in up to six colours—for the biscuit, cake, confectionery, quick frozen and fish industries will constitute the main feature of this stand. Also displayed on this stand will be the company's new developments in the lamination of *Diophane* to *Diophane*. The advantages that this lamination provides over single webbed film include greatly enhanced protection against moisture vapour and improved crease resistance as well as greater strength.

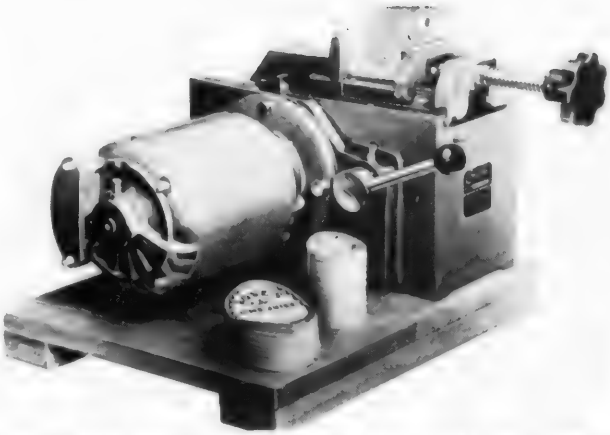
Viscose Development Co. Ltd. (Stand 9, Outer Row, First Floor, National Hall)

A display of *Viskrings* and *Viskaps*, non-metallic closures suitable for the final sealing of bottles and other types of containers, will be featured on this stand. This display will comprise self-adjusting, perfect closures shown in a wide range of colours and sizes in transparent and opaque materials, together with suitable plant for the drying of *Viskrings* and *Viskaps* by means of infra-red units. Other exhibits will include *Visking* cellulose sausage and food casings.

Visegrip Products Ltd. (Stand 4, Row B)

Patent neck closures and bungs will be featured by this company. These airtight, tamper-proof closures comprise: the *FlexSpout* closure, which incorporates a polythene retractable pourer-spout; the *ViseGrip* pressed steel or aluminium bung; and the tinplate *RingSeal* closure with tinplate pourer-spout.

The only address of "Food Manufacture" is 9 Eden Street, London, N.W.1.



Sauven Perforating Machine Co.'s "Codedge" junior, model No. 2, label dating machine.

The "Metaltector" metal detection machine, made by Loma Electronic Equipment Ltd.

The Dictionary of the Dairy Industry

DAIRYING is acknowledged to be one of the most complex of the food industries, one demanding an expert knowledge in many fields of study. In 1950 appeared a volume which attempted to encompass the salient details of knowledge in the industry. This work, "A Dictionary of Dairying," was described then as being monumental, and was welcomed by dairymen in many countries. Its 766 pages of text were the work of Dr. J. G. Davis and some 36 eminent authors of special sections.

Five years have elapsed since this first edition was published, and in this period some important advances in knowledge have been made. Rapid changes in the industry have inevitably occurred as the headway lost in the war years has been recovered. For this reason, a demand has arisen for a second edition of "A Dictionary of Dairying"—not one that embodies merely trivial amendments, but a revised work embracing this new knowledge.

The new edition,* now available, justifies all expectations. Its size has been increased to 1,132 pages of text and these include specially contributed features on 57 different subjects. As before, many sections have been contributed by distinguished authorities and it is evident that great care has been taken to draw upon up-to-date and first-hand experience throughout.

Thus, at random, may be instanced the inclusion of a six-page article in the new edition on "Mechanical Handling in the Dairy Industry." This is the work of W. W. Ritchie, B.Sc., and includes the sentences: "The advances that have been made by mechanical handling have shown that the design of a new dairy should not be too permanent, but should allow for possible expansion and or modification in order to make the dairy capable of adopting a new mechanical process as it is evolved. The substantial buildings of the past . . . have in too many cases prohibited the use of some new mechanical handling technique, and thus prevented some dairies from achieving real economies in work and costs." Here is clearly the result of practical experience and an insight into handling developments possessed only by the specialist.

Space does not permit a full list of the specially contributed sections to be given; the subjects that follow have been selected merely to show the scope of the work: "Effluents in Dairies" (L. A. Allen, D.Sc., Ph.D., F.R.I.C.; 18 pages); "Milk Constituents in Breadmaking" (A. J. Amos, Ph.D., B.Sc., F.R.I.C.; 2 pages); "Legal Aspects" (A. L. Barton and P. O'Neill, M.A., B.C.L., Barrister-at-law; 13 pages); "Retail Dairying" (S. Clifford, B.Sc., A.M.I.Mech.E.; 4 pages); "Packaging of Dairy Products" (J. G. Huntley, B.A.; 7 pages); "Physics" (various articles) (G. W. Scott Blair, M.A., D.Sc., Ph.D., F.R.I.C., F.Inst.P.); "Kosher Milk" (J. Wolf, B.Sc.; 1 page).

Authoritative treatment

Dr. Davis himself writes with authority on many topics; under "Resazurin and Resazurin Tests," for instance, we find 12 pages of detailed treatment and references. "Cheese" he deals with in 50 pages, mentioning all the principal varieties of the world, and indicating their characteristics and method of preparation. In the 46-page section on the various aspects of pasteurisa-

* *A Dictionary of Dairying.* By J. G. Davis, D.Sc., Ph.D.(Lond.), F.R.I.C., M.I.Biol., F.R.San.I. Pp. 1132+xxviii. illus. London: Leonard Hill Limited, Stratford House, Eden Street, N.W.1. 65s. net.

tion, he is assisted by contributions from Prof. E. L. Crossley, B.Sc., F.R.I.C., and H. Burton, B.Eng. The latter's section on "Alternatives to Pasteurisation" occupies 5 pages—a considerable improvement on the original paragraph on the subject in the first edition. The alternative methods dealt with include treatment by high-velocity electrons, radio-frequency electricity, ultrasonic radiation, ultra-violet radiation, and *X*-rays. The section is one that can be recommended to all with an interest in the industry.

Another section which will be welcomed in its new expanded form is that by E. B. Rice, M.Sc., on buttermaking machines. In the first edition, the paragraph devoted to the subject mentioned some of the most important types of equipment for buttermaking without orthodox churning, and concluded that it was not yet possible to assess their suitability for this country. In this second edition, the treatment covers just over three pages. The new processes are subdivided into (*a*) separation processes and (*b*) accelerated churning processes; under the former classification are described the Alfa, Cherry-Burrell, Creamery Package, New Way, Fritz, and Senn processes. The Fritz process was in actual use in over 40 plants in Germany in 1946. Butter emerges from the machine as a continuous ribbon, and can be packed directly at the rate of 2,000 lb. hr.

The design of dairies, large and small, and dairy farm buildings is treated in 33 pages. Floor plans are given for various types of building, and the arrangement of machinery is discussed in detail. The section includes advice on the construction of gulleys and roofs, and hints on ventilation and lighting.

"Water Supplies for Dairy Premises" is the subject of a lengthy section. The importance of the subject is brought out by figures of the water usage by various dairy premises—in two cheese factories, an average of 3,350 gal. of water was used for every ton of cheese made. Sources of water are dealt with, and advice is given on the construction of various types of well. The chemical characteristics of water supplies occupy 2 pages, and are followed by a sub-section on the microbiology of water.

Equipment for water softening is fully illustrated in the section on "The Control of Boiler Water." The treatment of condensate and feed water by various means is summarised, and some notes are given on boiler-water testing.

No attempt is made, of course, for such sections to be exhaustive; after a summary of the subject, the reader is referred in each case to the literature, references being almost invariably confined to works in English that are readily accessible. When the subject under discussion has been treated at length in a fairly recent publication, the mention in the "Dictionary" has been kept as brief as possible. This must be borne in mind when the treatment of some subject may seem to be short. Under "Yoghurt," for example, can be found only two inches of text on the characteristics and preparation of this cultured milk; however, the subject was treated very fully in a British journal by Dr. Davis himself in 1952, so that repetition is unnecessary. In this way the "Dictionary" has been kept to a manageable size without loss of comprehensiveness.

A valuable feature of the "Dictionary," now extended slightly in the second edition, is a list of the more important subjects, given as suggested reading for students and others preparing for examinations. This comes immediately before the main body of text. As many of the sections mentioned have been enlarged, the textbook provided by this list is now of considerable merit. The title of the work, "A Dictionary of Dairying," may mislead many into thinking that all the references in it are too brief for general reading; this, of course, is far from being so, as a glance, say, at the 50-page section on cheese will prove.

The book is admirably printed and bound, and is illustrated with a large number of line drawings and photographs. Those who have seen the first edition of this work will need no convincing as to the "Dictionary's" value; the extent to which this has been enhanced in this second edition makes this volume indeed an essential guide for the dairyman.

CORRESPONDENCE

Fortification of White Flour in Britain

To the Editor,

DEAR SIR,—In his article on "Food Fortification" in your December issue, Dr. R. R. Williams, while conceding that Britain made the earliest proposal for fortifying a staple food, states that in fact the policy was never carried out in respect of British civilian supplies of white flour. In fact, before the shipping situation made it necessary for Britain to go over to the use of higher extraction flours, the policy of fortifying with vitamin B_1 had been implemented to such a degree that over half the white flour then in use in Britain was being fortified with vitamin B_1 at the rate of 0·6 g. per sack of 280 lb.

I was at that time responsible for the technical aspects of this fortification and well remember as an outcome of this policy the assaying of flours for vitamin B_1 from quite a large proportion of the flour mills in Great Britain.

Therefore, not only was the idea of fortifying a staple foodstuff with a vitamin presented to the U.S.A. but actual experience in so doing, though short-lived, can also be claimed.

R. G. BOOTH,
Research and Development Director,
Chappie Limited.

Melton Mowbray,
Leics.

Food and Finance in 1954

By M. Duffy

Most public companies in the food industry reported higher profits during 1954. However, the financial years covered ended between the close of 1953 and the summer of 1954, so they cannot be taken as representative of business conditions for the whole of 1954. In the following summary the figures in brackets are those for the previous year.

THE report for **Hunters the Teamen,** issued in April, was an exception to the general trend of higher profits as trading profit appeared as £106,500 (£110,100) for the year ending January 2, 1954. The chairman said that they had sold a number of their premises which they did not occupy. **Aplin and Barrett** returned £367,400 to December 1953 (£217,000). The chairman said that de-rationing of butter and cheese would have considerable effect on finances of the company. **Associated Fisheries** announced £604,500 (£715,800) for the year ending September 1953. Their fishing activities are now solely confined to trawling in distant waters. For the year ending December 1953, **Crosse and Blackwell (Holdings)** gave net profit as £534,100 (£496,500). Another April report was that for **United Kingdom Tea Co.,** to year ending January 2, 1954, with trading profit £71,100 (£78,100).

Food Company Shares in 1954

Name	*Class*	*High*		*Low*		*Latest*	
Allied Produce	10s. "A"	9s.	4½d	2s.	1½d.	8s.	0d.
Aplin and Barrett	£1 Ord.	7 8s	0d.	5 1s.	4½d.	6 1s.	0d.
Associated Biscuit Manufacturing	£1 Ord.	54s.	9d.	37s.	9d.	53s.	9d.
Associated Fisheries ..	5s. Ord.	11s.	3d.	5s.	10½d.	11s.	0d.
Beecham Group	5s. Defd.	25s.	3d.	13s.	4½d.	24s.	3d.
Beer, L., and Sons	5s. Ord.	16s.	3d.	13s.	4½d.	14s.	0d.
Brooke, Bond and Co. ..	5s. "A" Ord.	22s.	6d.	16s.	4½d.	18s.	7½d.
Crosse and Blackwell ..	£1 Ord.	19s.	0d.	11s.	6d.	16s.	0d.
Fortnum and Mason	£1 Ord.	52s.	6d.	38s.	6d.	52s.	0d.
Foster Clark	10s. Ord.	14s.	3d	8s.	6d.	9s.	0d.
Hanson, Samuel	5s. "A"	3s.	3d	2s.	0d.	3s.	0d.
Home and Colonial Stores	4s. Ord.	13s.	4½d.	7s.	3d	12s.	4½d.
Hunters the Teamen	£1 Ord.	48s.	0d.	45s.	0d.	45s.	0d.
International Tea Company's Stores	5s. Ord.	29s.	3d.	18s.	1½d.	25s.	9d.
Leach's Argentine Estates ..	10s. Ord.	3s.	3d.	2s.	1½d.	3s.	0d.
Lipton	£1 4% Pret.	17s.	7½d.	15s.	4½d.	17s.	7½d.
Lovell and Christmas ..	£1 Ord.	17s.	0d.	14s.	3d	14s.	10½d.
Lyons, J., and Co.	£1 Ord.	116s.	3d.	92s.	0d.	112s.	6d.
Maypole Dairy	5s. Prefd. Ord.	19s.	1½d.	15s.	1½d.	19s.	0d.
Mazawattee Tea Co. ..	6s. 8d. Ord.	6s.	9d.	4s.	0d.	6s.	3d.
Meadow Dairy	£1 7½% Pret.	27s.	7½d.	25s.	7½d.	27s.	7½d.
Melhuish, Wm.	4s. Ord.	4s.	7½d	3s.	0d.	4s.	0d.
Nuthalls (Caterers) ..	2s. Ord.	5s.	6d.	3s.	3d	5s.	1½d.
Peek Bros. and Winch ..	£1 Ord.	11s.	7½d.	9s.	0d.	9s.	6d.
Smith's Potato Crisps ..	5s. Ord.	38s.	0d.	26s.	1½d.	34s.	0d.
Teetgen and Co.	£1 5½% Pret.	10s.	0d.	15s.	6d.	19s.	6d.
Thomas and Evans	10s. Ord.	50s.	0d.	38s.	0d.	50s.	0d.
Union International	£1 6% Pref.	24s.	7½d.	22s.	7½d.	24s.	1½d.
United Counties Stores ..	£1 6% Pref.	18s.	1½d.	17s.	3d.	18s.	0d.
United Dairies	£1 Ord.	70s.	0d.	52s.	0d.	67s.	6d.
United Kingdom Tea	£1 5% Pref.	17s.	4½d.	14s.	6d.	15s.	9d.

In May, **Home and Colonial Stores** announced trading profit for 1953 as £3,548,000 (£3,255,000). The chairman said that trading conditions would become more competitive, but with the increased opportunities of selective buying and energetic management he was cautiously optimistic about future prospects. **Lipton's** results were issued in May with trading profit for the year ending January 2, 1954, at £896,000 (£782,000). The chairman said that although the turnover for 1953 showed a satisfactory increase over the previous year, the rate of gross profit was again slightly lower and operational costs, mainly wages, higher. **Maypole Dairy's** report was also issued about the same time, also for the year ending January 2; trading profit was £592,000 (£552,000). The chairman said that it was vital for them to take full advantage of the changing conditions firstly to rebuild their trade in those commodities in which they specialised before the war, and secondly to develop the lines introduced since then. Another May report was **Meadow Dairy's,** also for the year ending January 2; their consolidated trading profit was £689,000 (£614,000). Finally in May there was the report of **Associated Biscuit Manufacturers,** whose trading profit for the year to December 1953 was £1,733,000 (£1,500,000).

A widely discussed report issued in June was that for **J. Lyons and Co.** for the year ending March 31, 1954, with trading profit at the new high level of £4,299,000 (£4,162,000). The report of **Smith's Potato Crisps,** for the same period, disclosed trading profit at a new record of £518,000 (£441,000). The chairman said that production and sales were now at their highest level with turnover of over £3 million per annum. They were now making and selling about 400 million packets of crisps per annum. June also saw the results for **William Melhuish (Proprietors)** for the year ending December 1953; profit was £108,000 (166,000). The chairman reported that they had acquired a small sweet manufacturing business in Sussex. Later in June **United Counties Stores** announced a group profit for the

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year ending February 28, 1954, at £196,700 (£160,400). A final June report was that for **Thomas and Evans Ltd.,** also for the year ending February 1954, which showed a trading profit of just under £627,000 (£591,000). Later in the year it was announced that they had purchased from Bristol Industries Ltd. the whole of the share capital of Brooke and Prudencio Ltd. and other companies associated with the manufacture of *Neptune* soft drinks, and that they had disposed of their bakery plants at Cardiff and Porth to the Avana group.

An early report in July was **I. Beer and Sons',** for the year ending March 31, 1954; trading profit was £185,800 against £226,400, the latter figure being the highest in a steadily firming trend which had begun several years before. About the middle of July, **Allied Produce Co.** announced a trading profit for the year ending April 30, 1954, as £29,600, a considerable improvement on the £3,053 of the previous year which was the lowest point in a declining trend which began in 1951 when profits were £41,100. The chairman said that inwards orders continued at a satisfactory level and that a large contract had been entered into for the production of another line well within the capacity of their plant and equipment. The middle of July also saw the results for **Ridgways,** for the year ending May 1, 1954; net profit was £37,800 (£22,800). Finally in July, **Nuthalls (Caterers)** announced a trading profit of £22,740 (£27,000) for the year ending December 31, 1953. Later in the year it was announced that about 80% of the holders of Ordinary shares had accepted an offer for their holding.

In August, **Peek Bros. and Winch Ltd.** reported a trading profit for the year ending December 31, 1953, of only £2,330 against £52,000 in 1952 and £129,400 in 1951. In explanation of the sharp fall in profits the chairman pointed out that in the previous year he had made it clear that the position in the market here for imported continental canned goods was still obscure and that it was impossible to judge accurately losses which might be made on stocks which were on hand. The sum then set aside had not proved adequate. But as the final loss had now been ascertained, and was allowed for in the consolidated profit and loss account, they had brought back the partial provision made last year. The current year was described as being promising, so far, and their provincial subsidiaries had not only increased their total turnover in the first quarter but had also earned a considerably larger profit than in the previous corresponding quarter. The middle of August saw the report of **Teetgen and Co.,** for the year ending July 3, 1954, with trading profit of £26,100 (£24,500). The chairman said that the year had not been an easy one, but they had been able to increase turnover again to offset the ever-increasing costs. They had acquired the business of Walter and Lynn for the express purpose of smoking bacon in their own stoves for their own branches, an arrangement forbidden under controls but now practicable. The report for **United Dairies,** for the year ending March 31, 1954, showed the trading profit at a new high level of £4,120,000 (£3,816,000). The chairman stated that they were now able to meet whatever conditions might arise. For the year ending March 31 the **Beecham Group** also returned a profit for the parent company at a new high level, namely £1,061,000 (£766,000). Referring to the subsidiary company, C. & E. Morton Ltd., the chairman said that it had continued to develop the distribution of its soups and other canned foods to home consumers during the previous twelve months and that it intended to expand its advertising programme in the near future.

September was noteworthy for the report of **International Tea Company's Stores,** for the year ending May 1, 1954, with trading profit at £1,755,000 (£1,735,000). The chairman said that there had been some minor temporary setbacks in one or two of the smaller subsidiaries and in certain factory units. These were attributed to the changing habits of the shopping public. Their main retail companies had had a satisfactory year and their transport section had been well managed and had given excellent service. Another September report was that of **Lovell and Christmas,** also for the year ending May 1. This gave trading profit at £337,600 (£322,000). This was described as disappointing by the chairman, who said it arose from most difficult trading conditions and losses incurred by certain subsidiaries distributing goods which were arriving on a falling market and which, furthermore, cost a substantial amount to write down to market value. However, they had entered the new year with a healthy stock position, although trade would continue to be most difficult. Nevertheless he felt confident that they would be able to maintain their turnover.

October was noteworthy for the report of **Saml. Hanson and Son,** for the year ending March 31, 1954, which returned a loss of a shade under £50,000. This compared with a loss of £18,545 for 1953 and a trading profit of £78,100 for 1952. The adverse figures for 1954 were mainly attributed to disappointing and unexpected results from their subsidiary company, Tomango Ltd., which, however, was expected to make a profit in the coming year.

At the end of October **Union International Co.,** formerly the Union Cold Storage Company, reported the profit available to the parent company for the year ending December 1953 at £2,260,000 (£2,726,000). The latter figure was a record. About the same time **Leach's Argentine Estates** published their report for the year ending March 31, 1954, trading profit being shown at £182,100 (£262,826). The chairman said that although more sugar was obtained and sold during the year under review the obligatory levy thereon was again increased by the Government. Furthermore the alcohol market slump an-

(Concluded on page 36)

Abstracts From Recent Food Literature

High Frequency Heating in the Manufacture of Meat Products. F. P. Niinivaara and T. Ryynäen (*Die Fleischwirtschaft*, 1954, **6**, 416).—Following successful American trials with dielectric heating for the manufacture of certain meat products, the Finnish Research Laboratory of the Co-operative Slaughterhouses has carried out pilot tests with highly encouraging results. It was found that high frequency heating caused a rapid and uniform rise in temperature, resulting in uniform ageing so that sausages could be simultaneously smoked and refined in minutes. There is hardly any loss of energy since no heat is wasted. It was also found that the treatment has a favourable influence on the taste of the product. The method is also highly suitable for the unfreezing of frozen meat.

Cold Sterilisation Process, using Ethylene Oxide Gas, kills Bacteria in Spices and other Dry Food Ingredients (*Food Processing*, 1954, **15**, 20).—An improved process for protecting spices and other dry food ingredients against insect infestation and bacterial growth involves the effective use of ethylene oxide gas to achieve a reliable sterilisation without affecting the quality of the products. Eliminating contamination, the process reduces loss from waste and increases output. Involving the use of improved, practical treating procedures and a simple and safe final gas disposal, it reduces in-plant handling, improves operational safety, speeds processing, and results in considerable cost savings. It is said to be superior to fumigation and prolonged heating methods of infestation control.

Determination of Copper in Oils and Fats by means of Dibenzyldithiocarbamic Acid and its Salts. D. C. Abbott and R. D. A. Polhill (*The Anal.*, 1954, **79**, 547).—A method has been developed for the rapid absorptiometric determination of copper in oils and fats over the range 0·02 to 2 p.p.m. Most of the fatty matter is removed from the sample by vaporisation and the remainder is destroyed by digestion with nitric and sulphuric acids. The copper in the resulting acid solution is then determined, after dilution, by the extraction of its dibenzyldithiocarbamate with carbon tetrachloride and measurement of the optical density of this solution at 435 mμ in a suitable spectrophotometer. The method is shown to be free from interference by some other commonly occurring metals and to give a good recovery of added copper. A determination can be completed in two hours. The preparation of the dibenzylammonium, potassium, and zinc salts of dibenzyldithiocarbamic acid is also described.

Fully-automatic Refrigerating Plant for Slaughterhouse. H. Schmitt (*Kältetechnik*, 1954, **6**, 279).—A new slaughterhouse, embodying the latest features of technological progress, has been constructed at Kehl-on-Rhine. The chill rooms are designed to cater not only for local needs but also for import and export requirements. The plant comprises two independent refrigerating circuits, one for chill rooms with a temperature around 0°C., and the other for low-temperature refrigeration (−18°C.). Both circuits are working with ammonia evaporation. Thermostat control in all rooms ensures fully automatic adjustment of the refrigerant and, thus, of the temperature. The machinery is protected by relays, safety valves, etc., against over-pressure, excess current, etc.

Lactose as a Dairy By-product. P. D. Clausen (*Deutsche Molkereizeitung*, 1954, **75**, 1239).—Before World War II, Germany was able to export considerable quantities of milk sugar (lactose). Owing to the loss of the eastern territories, there is now a shortage of this product, all the more so as it is increasingly being used for antibiotics. The possibilities of obtaining lactose as a by-product of dairy operations, using the whey of suitable rennets have, therefore, been examined. For this purpose, it is essential to use the whey as soon as possible before the inherent lactose is destroyed by bacteria and simultaneously to add innocuous bacteriostats. As the first cost of the installations required for such processing is fairly high, and the prices obtainable for lactose on the world market are not particularly good, the systematic production of lactose as a by-product of dairy operation will, for the time being, only be economic under special circumstances.

Hydrogenation Inhibitors for Olive Cake Oils. J. M. Martinez Moreno, F. Ramos Ayerbe (*Oléagineux*, 1954, **9**, 697).—Oils destined for hydrogenation must first be purified to eliminate certain substances which may have a toxic effect on the catalysts. In the case of certain olive husk oils, normal refinement is not sufficient to remove these substances effectively. On the other hand, the refining process may also entail the wasteful removal of useful ingredients. Prerequisite to the task of designing more economic alternative purification methods is a more profound knowledge of the hydrogenation inhibitors in the oils concerned. The problem is particularly topical in Spain where improved processing methods for olive cake oils might permit the extraction of fats, etc. otherwise wasted.

The authors propose a simple research technique on hydrogenation inhibitors in olive cake oils, based on filtration across a chromatographic adsorption column. This method permits a quantitative assessment of the inhibiting substances and their power. Pilot tests carried out on this basis have produced results of considerable practical importance.

Heat Storage in Milk Processing Plants. K.-H. Suttor (*Deutsche Molkerei-Zeitung*, 1954, **75**, 1269).—Owing to the heavy daily fluctuations in power demands, the overall efficiency of milk processing plants equipped with

steam boilers can often be improved by the installation of heat storage apparatus, which has the effect of meeting peak demands, even in excess of the boiler output, at the same time enabling the boilers to be kept going at a uniform, economic rate. Surplus steam generated at times of slack demand can thus be used to preheat either the boiler feed water for use at times of peak demand, or hot water for general supply or heating purposes.

In yet another system, the surplus steam from a high-pressure system can be used to overheat the water in a tank from which the heat is released to a low-pressure system at times of peak demand. For each of these systems, examples from actual practice are quoted.

The Vitaminisation of Milk, Milk Products, Margarine, and Fats with Vitamins A and D. K.-H. Wagner (*Fette, Seifen, Anstrichmittel*, 1954, **56**, 681).—The average diet in Germany has changed in recent years in such a way that there is a marked lack of vitamins, especially A and D. The lack can be made up only by vitaminising certain basic foodstuffs. The Institute for Nutritional Science at Giessen has paid particular attention to the problem of adding vitamins to milk, butter, margarine, cheese, and lard to compensate for this deficiency.

Preservation of Frozen Poultry. R. Thévenot (*La Revue de la Conserve de France et de l'Union Française*, 1954, **9**, August/September, 95).—Summary of a paper prepared by the author who is in charge of the Refrigeration Section of the French Ministry of Agriculture. After discussing the preparatory treatment of poultry prior to freezing (diet before slaughter; warming of the carcass before plucking; reasons for and against evisceration; temperature during evisceration), the author deals with the freezing process proper (speed of freezing, avoidance of freezer burn; use of antioxidants; temperature during cold storage), with the packing methods and materials, and with the preservation of offals.

Investigations on the Quality of Diploid and Tetraploid Rye for Breadmaking. H. M. R. Hintzer and H. de Miranda (*Cer. Chem.*, 1954, **31**, 407).—The baking quality of eight varieties of diploid rye grown at six locations in the Netherlands in 1948 was correlated with maltose value and amylase activity (both negatively), with maximum viscosity in the amylograph (positively), and with other properties associated with sprouting. Large interfield differences were found, whereas varietal differences were small.

Tetraploid rye was higher in protein content, lower in alpha-amylase activity, and superior in baking quality to diploid rye from different fields. The data indicate that tetraploid rye may be the more resistant to sprouting.

Preservation of Fish by Freezing and Glazing. G. Oppert (*Kältetechnik*, 1954, **6**, 274).—The usual storage of fish on ice is not an adequate safeguard for the preservation of the fish. Much better results can be obtained by freezing the fish whole and applying an ice coating, known as glazing. It is this method which has been made the subject of detailed research, extending over all the mechanical and thermal processes involved, *i.e.* scaling, freezing, glazing, defreezing. Also investigated was the resistance of the ice coating against mechanical impacts. The results showed that, to obtain a minimum weight loss compatible with economic processing methods, the fish should be dipped for glazing one to three times for periods of between four and 12 seconds.

Whey Powder

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Types of Mill

There are various types of mill which can be used for this process. It is a practice at some creameries to feed the whey rock into a pin mill, which reduces the rock into powder. This, in turn, is passed through a sifter with a fine mesh, so as to separate the coarser pieces from the fine powder. If the final powder is required to pass through a 30-mesh screen a fair quantity of tailings will occur, which must again be passed through the mill for reducing into a fine powder. If the amount of tailings is fairly substantial it might be desirable in certain conditions to insert two mills to work in series. This method should result in a considerable reduction in the quantity of tailings returned from the sifting machine.

Hammer mills can also be used for crushing whey rock.

The final product is packed in hessian or paper bags having a bituminised paper lining and is stored in a dry room ready for despatch.

Food and Finance

(Concluded from page 34)

nounced the previous year had brought the prices of this commodity down to unremunerative levels. Only an excellent fruit crop and marketing had prevented results from being more disappointing.

Brooke, Bond and Co.'s report for the year ending June 30, 1954, was issued early in November; net profit was at the new high level of a shade under £2 million against a little over £1 million for 1953. The all time record profit for 1954 was due to massive contributions from plantation companies, according to the chairman. Later in November, **Fortnum and Mason** published their results for the year ending August 31, 1954, with trading profit of £130,600 (£123,400). The chairman said that their own branded grocery products were finding increasing favour with American customers.

Food manufacturing company shares fully participated in the generally buoyant and active conditions which prevailed in the industrial department of the London Stock Exchange during 1954, with prices at the end of the year at or around the best levels for the period. This will be seen from the accompanying share price table.

Machinery and Equipment

Continuous brine makers

Continuous brine makers which provide a constant supply of fresh pure brine without the use of an agitator or any moving parts, are being made by A. Johnson and Co. (London), Ltd.

The units are made from stainless steel in sizes ranging from an hourly capacity of 33 to 300 gal. dissolving from 106 to 954 lb. of sodium chloride per hr.

In operation the tank and hopper of the brine maker are filled with coarse-grained salt. Water enters near the top from a small supply tank fitted to the side of the main tank. A constant water-level is maintained in the supply tank by means of a float-valve. Moving downwards the water dissolves increasing quantities of salt until it becomes saturated. The rate of flow is determined so that the saturation point is reached about a foot above the bottom of the main tank. Below this point the salt is not dissolved but acts as a filter bed, thus assuring that the discharged brine is entirely free from dirt and other insoluble matter. When the salt in the filter bed becomes clogged up with insolubles it can be flushed away by means of flushing nozzles which are built into the machine. The flushing operation takes only a few minutes.

The brine can be pumped anywhere it is needed. Furthermore, the machine can be combined with a storage tank, in which case a smaller and more economical size of brine-maker can be used. Both machines and tanks are controlled by float valves, making operation quite automatic. The only labour needed is for replenishment of the salt supply and occasional flushing out.

Continuous brine maker available in capacities ranging from 33 to 300 gal./hr.

Dry vacuum pumps

A wide range of dry vacuum pumps, called *Pearn* pumps, is made and marketed by Holden and Brooke Ltd. of Manchester.

The units are of the reciprocating slide valve type and are made either single-stage or double-stage, depending on the degree of vacuum required. The range covers a volumetric capacity of 900 to 45,000 cu. ft./hr.

A feature of the pumps is a trip port which equalises the clearance volume pressure with the vacuum side and so provides the highest possible volumetric efficiency while the minimum amount of power is absorbed, it is claimed.

These pumps are suitable for evaporating fruit juices, milk, food extracts and other substances sensitive to heat, as the pumps ensure a low vacuum and, in consequence, a low boiling point. They are also used for filtration under vacuum, and when it is necessary a condenser is supplied to be fitted between the filter tank and pump inlet to prevent any condensate from entering the pump. This ensures that pump efficiency is maintained when operating at temperatures approaching the flash point of the filtrate and vacuum employed.

The APV-Manton Gaulin homogeniser which is now being made in England.

American homogeniser now British made

The American Manton-Gaulin homogeniser is now being manufactured by the A.P.V. Co. Ltd., London, and marketed by them in Europe and the Commonwealth.

The unit is said to be unique in using as standard a two-stage homogenising valve which includes two precision-ground stellite valves in series through which the product is pumped at high pressure to impinge on impact-rings at right angles to the flow.

The homogenisation pressure is controlled by independent adjustment of the two stages of the homogenising valve. With a pressure range of up to 5,000 p.s.i. the machine can be set to homogenise at the optimum pressure for any given product, the overall pressure being divided between the two stages in any desired proportion.

The design of the valves and the triple-throw eccentric shaft enables the homogeniser to operate at maximum efficiency with a speed of only 100-120 r.p.m. it is claimed.

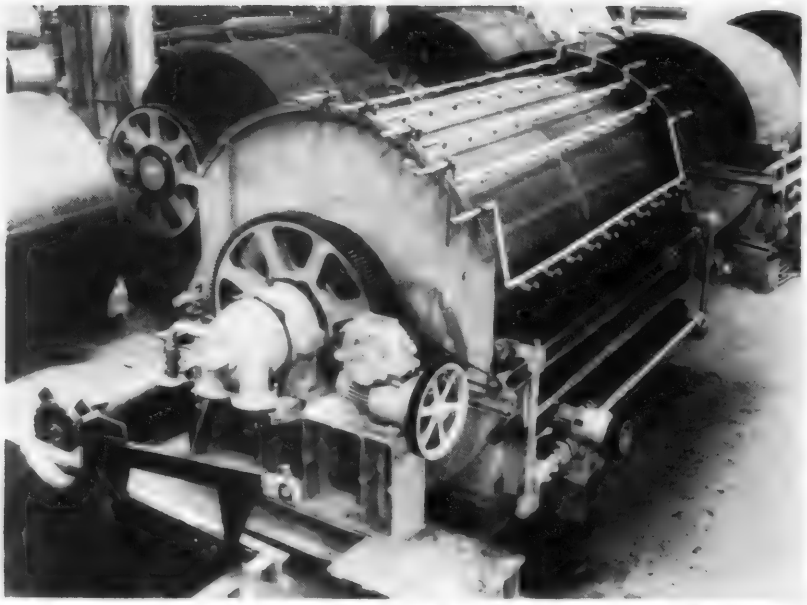
The electric motor, which is enclosed within the base of the machine for maximum protection, drives the eccentric assembly through a multiple vee-belt. The motor is mounted on a rocker plate which makes adjustment of the belt tension easy and preserves the pulley alignment.

The triple plunger pump is said to give perfect balance and freedom from vibration as well as to minimise pulsations in the delivery line. The plungers are driven from an eccentric assembly through crossheads. Self-aligning herring-bone gears drive the eccentric shaft and ensure quiet, vibrationless operation and long working life.

A positive pump geared to the drive shaft supplies oil under pressure to all the drive shaft and eccentric shaft bearings, big end and wristpin bearings and crosshead bearings. On size 2, 3 and 4 machines, a de-humidifying system prevents oil dilution due to condensation. A safety switch can be supplied to stop the machine in the event of oil pressure failure.

Solid nylon packing rings which are said to be chemically inert, practically frictionless and highly resistant to wear are embodied in this machine. They will withstand steam or chemical sterilisation and in conjunction with a special synthetic rubber seal ring, provide an effective leakproof packing which can be speedily removed for cleaning.

The cylinder assembly comprises a



A typical rotary vacuum filter in the works of the manufacturers, Davey, Paxman and Co. Ltd. These filters are available in sizes from 2½ sq. ft. to 700 sq. ft. filtering area.

single-piece forging of 18-8 stainless steel, machined to precise tolerances. All fittings and parts are interchangeable, and the whole unit is designed for ease of stripping and reassembly. Tapered front and top cylinder cap bosses and bevelled cylinder ports eliminate gasket recesses, which facilitates cleaning of the whole assembly.

An important feature is the positioning of the cylinder block studs on the centre line of the plungers. This is said to eliminate any bending moment on the cylinder block which might give rise to distortion causing excessive wear or even resulting in seizure.

Another feature of the homogeniser is the ease with which the capacity may be varied, within the horse-power range of the motor, merely by changing the plungers and cylinder packings for others of the appropriate diameter for the desired output.

Four sizes are available, covering the range from 600-2,000 Imp. gal./hr.

Inverted conduiting

A new form of inverted trunking or conduiting, carrying wiring and cables, lighting and other electrical fittings, which may be quickly and simply attached by means of T-bolts has been introduced by the British Thompson-Houston Co. Ltd.

It consists basically of a one-piece aluminium extrusion, which is joined by a channel section where necessary. A spring steel cover fillet completes the section when all wiring is in position; similarly it is only necessary to remove this when alterations to the circuits or fittings are desired. Overall dimensions are: width 4 in., depth 1·11/16 in. Angle, tee and crossover sections are available to order.

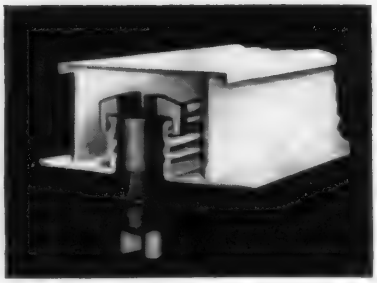
Invertrunking may be mounted flush on to beams or structural ceilings, or cast-in-situ (when a protective coat of bituminous paint is necessary). It can be used with plaster, either faired into a shallow cove or used with expanded metal to provide deep coves. It has been designed with the suspended ceiling in mind, and the broad flanges support standard forms of ceiling tiles. Circuit wiring may be inserted after the ceiling is completed, and the use of the new type of BTH connector block, called a *Parablock*, at intervals in the main wiring allows lighting layouts to be simply and quickly altered. Price: 4s. 3d. per ft.

Machinery agents acquired

Varley Pumps and Engineering Ltd., the English subsidiary of the Food Machinery and Chemical Corporation, California, have acquired the business of Charles E. Douglas and Co. Ltd., 86, Strand, London, W.C.2.

This company has been for many years the British agent of the parent corporation, handling their food processing and packaging machinery business here.

Charles E. Douglas will continue as the selling organisation for these products, and the managing director, Mr. T. A. S. Johnson, has been appointed to the Varley Board. Mr. J. H. Bentley, managing director of Varley Pumps, has been appointed chairman of Charles E. Douglas and Co. Ltd., and Mr. Wm. DeBack (a director of Varley Pumps and a vice-president of F.M.C.C.) has been appointed to the board.



A section of Invertrunking in extruded aluminium showing a T-bolt used to suspend lighting and other fittings. It has been designed with the suspended ceiling in mind, and the broad flanges support standard ceiling tiles.

Rotary vacuum filtration

The continuous mechanical dewatering of slurries can be continuously carried out by rotary vacuum filters. Filters of this type, and others which provide a range to cope with many of the requirements of the food and chemical industries, are made by Davey, Paxman and Co. Ltd., who recently invited representatives of the technical press to visit their Colchester works to see the manufacture of these machines.

Rotary vacuum filters are built in sizes from 2½ sq. ft. to 700 sq. ft. filtering area and are available in cast iron, mild steel, stainless steel, aluminium, monel metal, etc., and can be covered with rubber or other acid-resisting materials to customers' requirements.

During the visit a filter was seen handling a slurry composed of 1% fibrous solid and 99% liquid which was delivered in a solid cake which could be easily handled.

Also shown were a 10 sq. ft. mild steel filter sheathed in rubber for filtering corrosive acids and a 10 sq. ft. cast iron filter which is fully portable, and is of the type sent out on loan to prospective customers for them to test its suitability under actual working conditions.

Among the slurries which have been treated in Paxman rotary vacuum filters are acetic acid, groundnut meal, salt brine, starch and vegetable protein.

Paxman also make band filters for sugar manufacturers, who use them to wash and de-water the charcoal used in the refining process. In this way the charcoal can be used repeatedly.

Another filter built by the firm is the Bird centrifuge filter, which is made for Vickerys Ltd., who hold a licence from the original American manufacturers. The example seen was fabricated in stainless steel. Two further stainless steel filters under construction were seen. The bowls, spiral conveyor and tube holes were hard-faced with a special wear-resisting material welded to the main structure.

News Digest

Changes in the National Diet

MORE BEING SPENT ON BASIC FOODS

The latest national survey of food expenditure and consumption shows that Britons are eating more meat and eggs and drinking more tea. Less milk is being drunk and the national appetite for cheese, fish, vegetables, fruit and cereals has declined slightly except in the case of cheese, the consumption of which has dropped by 21%.

This information is given in the report of the National Food Survey Committee on domestic food consumption and expenditure in 1952, and the comparisons are made with 1951. The new survey, which was published recently by H.M.S.O. (4s. net), is the most comprehensive yet published because it covers not only all sections of the population but also every month. Such continuity and national coverage had not previously been achieved together, but the simplified field work introduced in June 1951 has now made this possible. Now that the Survey has been carried out on a national basis for three years it is possible to take a broader view of the results and to describe general features with less comment on the detailed figures. The basic tabulations of data, which will be preserved for reference, give full particulars of consumption and expenditure for each social class and family type in respect of 106 foods. However, in the sections of the report dealing with social class and household consumption a simplified, though nonetheless comprehensive, list of 27 food groups has been used. The report again includes tables showing the energy value and nutrient content of the diet of different groups, compared with standards based on the British Medical Association's recommendations.

The report shows that British households were spending 15% more on food in the last quarter of 1952 than in the same period of 1951. The average annual expenditure per head per week was 20s. 8d., compared with 18s. 10d. per head per week in the fourth quarter of 1951.

Households spent 36% more on meat, 23% more on cheese, 13% more on milk, 35% more on eggs, 10% more on fats, and 14% more on sugar. The amount spent on fruit was down by 5%, 10% more was spent on cereals, 38% more on tea, but 12% less on coffee and cocoa drinks.

Expenditure on most foods went up during the year, mainly because of rising prices. The amount spent on bread increased by nearly a quarter, on flour by about a third, while twice as much was spent on bacon.

The diversion of expenditure to the basic foods represented a real change in the pattern of the diet, the report states, 53% of expenditure being devoted to the subsidised foods during the last quarter of 1952, compared with 48% in the corresponding months of 1951.

All classes increased their expenditure during the year, but class differences became less, apart from old-age pensioner households.

The consumption of cheese declined steadily during the year, from nearly 2·5 oz. a week in the first quarter to 1·9 oz. in the fourth. The consumption of rationed meat rose from about 10 oz. per week in the first half of the year to nearly 14 oz. in the second half as supplies became more freely available.

Less fish and butter was eaten, but more margarine. The consumption of bread, biscuits and cakes was lower in the second half of the year than in the first. The increase in the tea ration led to an increase in consumption from 2 oz. to 2·4 oz. in the third quarter, but no further increase took place in the national average when rationing ended.

Wall's new office building

A new three-storey office block on the site of the Atlas Road, Willesden, meat-products and bacon factories of T. Wall and Sons Ltd. was opened on December 7 by the Mayor of Acton. The new building, which houses the entire office staff of the company's London factories, releases previous office space in the meat-products factory for sausage manufacture. Completed in nine months, including partitioning and all services, the building looks directly on to the approach road which serves the factories and is so designed that an additional floor can be added if required.

The whole of the main part of the building is planned on a four-foot grid, which particularly suits the *Holoplast* partitioning adopted for the two upper floors. The structural frame of the building is of reinforced concrete with hollow pot floors spanning it and supported on beams at the outside and down the centre, thus giving completely flush ceilings, except for the central beam. The first floor and roof project beyond the general building face on the two long sides and form a frame which is filled in with *Wallspan* curtain walling.

New casings company

Viskase Ltd., of 40, Chancery Lane, London, W.C.2 (Tel.: Chancery 8111), has been formed, in conjunction with the Visking Corporation of America, to market *Visking* products in Great Britain and overseas.

Since the opening of their Swansea factory the company report that the demand for their crystal clear cellulose casings is so great that the next step is a factory extension, with additional printing plant.

Nojax, the small *Visking* casing for skinless sausages, will shortly be used by many manufacturers who are planning to produce skinless fresh and smoked sausages and chipolatas. There is an increasing demand for *Visking* Zephyr casings, printed in two colours, for encasing cooked hams, fore ends and briskets.

Herrings and sugar: new bills

Among the legislation for the new session of Parliament, as announced in the Queen's Speech on November 30, is the following:

Herring Industry. A short bill will be introduced to provide more money for grants to the Herring Industry Board, mainly to assist the conversion of surplus herrings to oil and meal.

Sugar. A bill will be introduced to enable the Ministry of Food to cease trading in sugar and to preserve the Commonwealth Sugar Agreement of December, 1951.

Honeywell-Brown's new offices

Honeywell-Brown Ltd. have opened two new offices to serve the North Midlands, Wales and South-west England.

The Midlands office is at 119-21, Albert Road, Middlesbrough. The activities of this office, which is under the supervision of Mr. T. Halstead, will be co-ordinated with those of the Sheffield office.

The office serving Wales and the South-west is at 95, Exchange Buildings, Mount Stuart Square, Cardiff, and is under the supervision of Mr. L. G. A. Gabe.

Brewers' annual dinner

The Institute of Brewing (Yorkshire N.E. Section) annual banquet will be held on March 4 at the Old Swan Hotel, Harrogate, when Mr. G. F. Ripley (Chairman of the Section) will be in the chair.

No sugar-beet factory for the south

The Ministry of Agriculture has decided against erecting a sugar-beet factory to serve the south of England. Announcing this in the House recently, the Minister said that the savings in operating and transport costs such a factory would produce for the British Sugar Corporation would not balance the capital outlay of £3 million. He also stated that the Government could not at present contemplate an increase in the sugar-beet acreage.

Canned crab from Russia

Canned crab and increased quantities of canned salmon may now be imported from U.S.S.R. A small part of the existing quota for U.S.A./Canada salmon is also being re-allocated to cover traders who were excluded from the arrangements set out in Notice to Importers No. 668, either because they were not first-hand distributors or because they did not import other types of canned fish in 1953-54.

Full details are given in Notice to Importers No. 693 issued by the Board of Trade.

New welfare foods orders

Two new Welfare Foods Orders for 1954 covering Great Britain and Northern Ireland have been issued by the Ministry of Food. These orders, which came into force on October 31, 1954, replace those for 1953.

In S.I. 1401 (Great Britain) the principal changes are:

(1) Provision is made for the supply of liquid milk under the Welfare Foods Service against tokens issued to beneficiaries.

(2) Beneficiaries are no longer required to be registered with their milk suppliers.

(3) Suppliers are not required to keep records of milk delivered after October 30, 1954, to beneficiaries under the Welfare Foods Service.

(4) Certain beneficiaries are required to satisfy conditions as to their period of residence in Great Britain.

(5) Welfare Foods documents issued in Northern Ireland are valid for use in Great Britain.

In S.I. 1402 (Northern Ireland) the amendments are identical with the exception of (2) which does not apply; (4) which reads "... period of residence in Northern Ireland"; and (5) which reads "... in Great Britain are valid for use in Northern Ireland."

The Leonard Hill Technical Group this month

Corrosion Technology.—Corrosion of Tinplate by Foods Packed in Cans, 1; Determination of Plating Quality; Design Against Corrosion; Cathodic Protection of Underground Structures; Application of Metallic Phosphates to Cooling Water Treatments; The National Association of Corrosion Engineers.

World Crops.—World Agricultural Progress 1953-4; Increasing World Food Supplies, 2; Development of Spraying Machinery, 3; Fish Cultivation in Rice Fields; Problem Area in Norfolk; British Weed Control Conference.

Dairy Engineering.—Cheeses of Great Britain, 7; An Essential Guide for the Dairyman; Automatic Crating and Decrating; Review of Floor Construction with Special Reference to Dairy Floors; Bulk Collection—Two Private Schemes; Improvements in Heat Storage for Dairies; Bacteriology of Milk and Dairy Products; Equipment Ideas from the Continent.

Manufacturing Chemist.—Separation of Volatile Materials by Gas-liquid Chromatography; Spectrophotometric Determination of Thioglycollic Acid; Organic Syntheses in Perfumery; Glass Aerosol Packaging; Progress Reports: Cosmetics and Toilet Preparations, Antibiotics, Fertilisers.

Paint Manufacture.—The Study of Thixotropy; Titanium Pigments; The Economics of the Paint Industry; Paint and Package Production at a Factory; Ink Misting.

Fibres.—Recent Developments in Co-polymers; The Dyeing of "Terylene" Polyester Fibre; Transforming Cotton into New Textile Products through Chemistry; Fibrous Minerals, 1; Asbestos; Bonded Fibre Fabric; Formaldehyde—the Multi-Purpose Textile Finishing Agent; Fibre Data Sheet.

Chemical and Process Engineering.—Ion Exchange; Automatic Control of Distillation Processes, 2; Electrolytic Preparation of Molybdenum; Corrosion in the Chemical and Petroleum Industries; Sulphur Recovery from Fuels.

Petroleum.—Instrumentation and Automatic Control in Oil Refineries, 1; Corrosion in the Petroleum Industry, 3; Synthetic Detergents from Petroleum Sources; Fawley—the First Three Years.

Atomics.—Radioactive Waste Products in Food Sterilisation Studies; Nuclear Power Production and Utilisation.

Change of address

Holden and Brooke Ltd. have moved their York office to 2, St. Sampson's Square, York. (Telephone: York 4583.)

Obituary

William Walter Mansfield, of Barking, Essex, shortly after he had completed 60 years' service with Batger and Co. Ltd. He was 73. Tom Mansfield, as he was popularly known, was "king" of the mint lozenge department of which he was foreman for most of his service.

Flavouring materials

Aromatic chemicals developed recently by the Birmingham Chemical Co. Ltd. include Berry *Truroma*, used in the compounding of berry fruit flavours and in maple and butterscotch flavours, allyl caproate, gamma undecalactone, citral and terpeneless and sesquiterpeneless oils.

Of interest to manufacturers handling fruit juices are weighting oils for flavour dispersion and stable cloud, as also a range of emulsions to suit any specific gravity.

A further development is the concentrating of fruit juices under high vacuum, which enables the company to offer a range of *Vactell* fruit juices and concentrates for all branches of food manufacture, thus meeting the steadily growing demand for natural base flavouring materials.

The Birmingham Chemical Co. Ltd. is a subsidiary of the Staveley Coal and Iron Co. Ltd.

Gallate antioxidants

The revised recommendations relating to the use of antioxidants in foods, recently issued by the Ministry of Food, have stimulated further interest in the esters of gallic acid.

These gallates were originated by Dr. E. Boehm of Nipa Laboratories Ltd., and the company alone has since guided their development in this and other countries. Not only the lower aliphatic esters, but the higher esters, including the octyl, dodecyl, cetyl and stearyl esters, are now being produced on a commercial scale and are being marketed throughout the world under the registered trade name of *Progallin*.

The various esters are differentiated from one another by appending the first letter or the first two letters of the alkyl group to the name progallin; thus methyl gallate becomes Progallin ME and propyl gallate becomes Progallin P.

The application of the Progallins as antioxidants is not confined to foods, as they can be very effectively employed in many other spheres, *e.g.* in animal and vegetable oils and fats, cosmetics, pharmaceutical products, essential oils and in certain technical and industrial fields.

Technical and other details as well as samples are available from P. Samuelson and Co., London, who are sole distributors in this country for Nipa Laboratories Ltd.

Erections and Extensions

Vitamins Ltd. are proceeding with the erection of new extensions to their factory at Crawley, Sussex. The scheme entails an expenditure of £40,000.

■

Oxo Ltd. will shortly erect a new building to form an extension of their existing warehouse at 42, Newington Green, Stoke Newington, London, N.

■

Hadrian Supply Co. Ltd. are seeking to purchase a site at West Chirton, Tynemouth, for the erection of a cooked meats factory and warehouse.

■

Plans are in hand by the **Herring Industry Board** for the proposed construction of a meal factory at Greenhill, Fraserburgh, Aberdeen, at an estimated cost of £5,000.

■

John Bryson (Berwick) Ltd. have received planning permission for a £20,000 model bakery on Berwick Trading Estate, Tweedmouth, and work has begun. Most of the machinery and equipment in the firm's present bakery is modern and up to date and will be transferred. Among the new items to be installed are gas- or oil-fired Reel ovens.

■

Scribbans-Kemp (Scotland) Ltd., biscuit makers, of Edinburgh, are planning the construction of a new distribution and storage depot to occupy a site on the main Grangemouth-Falkirk Road, Falkirk, Stirling.

■

The erection of a new distribution depot at Thornes Road, Wakefield, Yorks, is planned by **J. Lyons and Co. Ltd.,** Cadby Hall, London, W.14.

■

W. J. Brookes and Sons, biscuit makers, are proceeding with plans to carry out extensions to their factory at Sharston Road and Bradnor Road, Manchester.

Nutrition course

Human nutrition - energy requirements is the subject of a course of ten lectures to be given in the Department of Food Technology, Battersea Polytechnic, London. The lectures will be held on Mondays, 6.30 to 8.30 p.m., from January 17 to March 21. The lecturers will include Dr. O. G. Edholme of the Human Physiology Unit, M.R.C., Dr. J. N. Hunt of the Dept. of Applied Physiology, Guy's Hospital Medical School, and Drs. H. E. Magee and W. J. Berry of the Nutrition Division, Ministry of Health.

A publisher in the United States—Leonard Hill's impressions

Mr. W. Leonard Hill, chairman of Leonard Hill Limited, publishers of FOOD MANUFACTURE and the 12 other journals comprising the Leonard Hill Technical Group, gave some impressions of his recent tour of the United States at a reception held on December 1 at the Wellcome Research Institution

W. Leonard Hill — a new portrait

in London. About 150 guests of the company attended the reception and were received by Mr. Hill.

Sir Harold Tempany, C.M.G., D.Sc., editor of *World Crops*, introduced Mr. Hill, who spoke for just over an hour about his tour which embraced the Caribbean Islands, Louisiana, Texas, Oklahoma, Tennessee, New Jersey, and New York. The interest of the talk was enhanced by a number of lantern slides of photographs taken by Mr. Hill. Among the places he visited was the Tennessee Valley Authority, which has contributed considerably to food production in the U.S. by its manufacture of fertilisers. Another outstanding impression was of the new Microbiological Laboratories at Rutgers University, New Jersey. Mr. Hill was conducted around this imposing new building by Dr. Olin Ball, a research specialist of the Department of Food Technology at Rutgers. A photograph and description of these laboratories appeared in the September, 1954, issue of FOOD MANUFACTURE, p. 375. Mr. Hill ranged over a wide diversity of subjects in his talk and gave some shrewd and well-received comments upon such topics as television advertising, food, architecture and rail travel.

The guests were representative of the Company's friends in its many fields of interest. Among the people who accepted invitations were: Mr. M. W. Perrin, chairman of the Wellcome Research Foundation, and his wife; Mr. L. D. Galloway, microbiologist, and his wife; Mr. Frank H. Gerrard, National College of Food Technology; Dr. J. Grant, analyst; Mr. G. M. Harcourt, Blaw Knox Ltd.; Mr. A. F. B. Neal and Mr. G. C. Graver, Distillers Co.; Mr. J. A. Pooley, Hiron and Rempler; Mr. A. G. Porter, Pascall Engineering Co. Ltd.; Mr. M. K. Schwitzer, Armour and Co.; Mr. E. A. Smith, Mono Pumps Ltd.; Mr. M. Sonn, Society of Dairy Technology; Mr. E. L. Streatfield, Chairman of the London Section of the Society of Chemical Industry; Mr. G. L. Thompson, Borax and Chemicals Ltd.; Mr. Baker, Stafford Allen; Dr. H. J. Barber, chairman of the Fine Chemicals Group, S.C.I.; Dr. J. R. Booer, F. W. Berk and Co. Ltd., and Mrs. Booer; Mr. E. L. Childs, Shell Chemicals Ltd.; Mr. A. Duckworth, secretary of the Association of the British Pharmaceutical Industry; Mr. Bertram Ward, Technical Advertising Service; Mr. W. N. Wright, Fredk. Braby and Co. Ltd.; and Dr. G. W. Cooke, Rothamsted Experimental Station, and his wife.

Young men will direct Wall's new companies

T. Wall and Sons Ltd. have formed two new operating companies for their ice-cream and meat products respectively. Dr. Philip Ridley, the firm's general technical manager, joins the board of the parent company. All the new directors are senior executives of the present company. Average age of the directors of all three companies is 44.

The two new companies were formed on January 1, their proposed titles being T. Wall and Sons (Ice Cream) Ltd. and T. Wall and Sons (Meat Products) Ltd. The reorganisation is necessitated by the expansion of the firm's ice-cream business and by the rapid growth of the meat business. It was recently announced that Wall's are building a £650,000 meat-products factory near Manchester.

Mr. Cecil Warren Rodd (53), Wall's chairman since 1947, will be chairman of both new companies.

The board of T. Wall and Sons (Ice Cream) Ltd., under Mr. Rodd's chairmanship, will consist of Mr. H. Gyle-Thompson (41) (vice-chairman) and Mr. J. G. Short (42), both members of the parent board; Mr. J. A. A. Beer (41); Mr. J. P. Meadows (35) and Mr. W. D. L. Webb (48).

The board of T. Wall and Sons (Meat Products) Ltd., also under Mr. Rodd's chairmanship, will consist of Mr. T. Trenchard (31), vice-chairman, a member of the parent board; Mr. R. H. G. Swain (41); Mr. H. McK Butcher (36); Mr. D. Campbell (53) and Mr. C. E. B. Brett (49).

APPOINTMENTS AND RETIREMENTS

Glaxo Laboratories Ltd. announce that Sir Maurice I. Hutton, C.M.G., relinquished executive duties as a director of the company on December 31, 1954, and will resign from the Board on June 30, 1955, in order to become managing director of The Anglo-Australian Corporation (Pty.) Ltd., Melbourne.

Sir Maurice joined Glaxo Laboratories Ltd. in January, 1949. He had been head of the British Food Mission in the U.S.A. since 1944.

▪

Mr. Ernest Borneman has been appointed Director of the Film and Television Division of Alfred Pemberton Ltd., the advertising agents who handle a number of food accounts, including Armour, Bisto, Saxa, Cerebos and Spillers. Mr. Borneman has had long experience as a film and television producer. Since 1935 he has written, directed and produced over 70 films.

▪

Mr. J. Dean, secretary of A.P.V.-Paramount Ltd., the foundry subsidiary of The A.P.V. Co. Ltd. at Crawley, Sussex, has been appointed a director of the company.

▪

Mr. W. Latta, sales manager of Rhodes, Brydon and Youatt Ltd., has been appointed a director of the company.

*

Enamelled Metal Products Corporation (1933) Ltd. announce the appointment of Mr. R. V. Arnfield, B.Sc., A.R.I.C., to their technical sales staff. He will assist in marketing a new range of Pfaudler high capacity, high pressure reactors which the company are now able to offer, as they have recently completed a new furnace of large capacity for the production of chemical units.

▪

Prof. S. J. Cowell, M.A., M.B., F.R.C.P., Professor of Dietetics, University College Hospital Medical School, has been elected chairman of the Nutrition Examination Committee of the Royal Sanitary Institute.

▪

Mr. Ernest W. Judd, Mr. Samuel G. Lane and Mr. James R. W. Stevenson have been appointed as directors of Stevenson and Howell Ltd.

Mr. Judd and Mr. Lane are respectively home sales manager and export sales manager, which appointments they retain.

*

Mr. S. A. H. Robinson is to be in charge of the new branch office recently opened by John Thompson Ltd. at "Ravenswood," Westfield Lane, Ryton-on-Tyne, Co. Durham. Mr. Robinson joined the John Thompson Group early in 1937 and has since then been associated with both the works in Wolverhampton and the London office. Since 1946 until this present appointment he was assistant to Mr. C. J. Howard, the Group's London managing director.

*

General Sir G. Ivor Thomas has joined the board of Rubber Improvement Ltd., manufacturers of *Leonex* non-toxic food belting.

*

Mr. Rupert E. Carr, chairman of the Cake and Biscuit Alliance Ltd. since 1952 and member of the council for the past 16 years, retired from the office of chairman at the annual general meeting recently.

A very warm tribute was paid to Mr. Carr by Mr. Wilfrid Hughes of Birmingham. He recalled Mr. Carr's great and varied work as chairman of many important committees of the Alliance which dealt with the industry's war-time problems, and also the pleasure and satisfaction it gave all members when he became chairman of the Alliance. "Mr. Carr has," said Mr. Hughes, "added lustre and stability to all the affairs of the Alliance. He has guided us through the remaining difficult years of restriction to the perhaps still more difficult years of freedom and competition which lie ahead of us.

OBITER DICTA

● Co-existence with Communism is as impossible as the co-existence of ice cream before a furnace.—*Dr. J. C. Heenan, the Roman Catholic Bishop of Leeds.*

● A 20-year-old girl ran screaming through the streets of Montauban, South West France, last night wearing nothing but a thin coating of icing sugar.—"*Daily Express.*"

● Considering what M. Mendes-France can achieve by drinking milk only, I foresee even greater things from a premier cast in the same mould who drinks burgundy.—*The Mayor of Dijon.*

● The Government appears to have attempted to achieve a workable compromise between what is hygienically desirable and what is legally enforceable. —"*The Economist*" *commenting on the Food and Drugs Amendment Bill.*

● English coffee is still bad and after sampling it I can well understand that nation's preference for tea.—*An American visitor commenting on his trip to England.*

● Apparently the tea which comes from numerous sources is mixed and blended in some mysterious way before it reaches the shops—but the fluid produced by this blend looks like mud, and the taste is just about as uninteresting. — *Letter to "The Times."*

● The mere transference of Major Lloyd-George from the sphere of animal feeding-stuffs to that of bastardy legislation is blinding in its boldness: who but an administrative giant could calmly discipline an Area Egg Officer one day and reprieve a murderer the next?—*Comment in "Punch" on the amalgamation of the Ministries of Food and Agriculture.*

● If the emasculated remnants of the original draft regulations become the statutory means of control, the widespread clean food campaigns conducted by national newspapers, radio and television programmes, and the activities of local authorities over many years, will be a true example of mountainous labours delivering a pathetic mouse.—*The Chief Sanitary Inspector of Coventry.*

Impulse sales

The Self-service Development Association say that it is impossible to keep track of the number of new self-service shops which are springing up all over the country at the rate of 20 to 30 each week. It is claimed that already there are more than 3,000 of these stores in the country, and they enable the housewife to scrap her shopping list; she does not need a reminder, as she sees the goods she wants attractively displayed.

The name given by the traders for this new spur-of-the-moment buying is "impulse sales," and these are certainly filling the housewife's basket. It is claimed that three-quarters of all the biscuits, sauces, pickles and relishes sold today are bought in self-service stores—by people who like the look of them and cannot resist a purchase.

Now farmers are arranging to send their produce to self-service stores already wrapped. Tomatoes and other vegetables are appearing in transparent wrappings. It is significant to note a revolutionary trend in connection with meat that is likely to increase sales. A newly formed packing company sponsored by the National Farmers' Union expresses the hope that they are expecting to sell meats in the same way.

COMPANY PROFITS AND PROSPECTS

The profits on trading of **Tate and Lyle Ltd.** for the 53 weeks ended October 2, 1954, amounted to £4,345,358, after charging depreciation of £1,065,138. For the 52 weeks to September 26, 1953, profit was £3,424,557, after £1,045,366 for depreciation. Record sales were achieved, amounting to 1,287,618 tons of refined sugar for the home market—an increase of 24%—and 815,708 tons for export, an increase of 37%. The final dividend recommended is 14½%, compared with 12½% for the previous year.

*

The Overseas Food Corporation had a revenue deficit of £516,658 in the year ended March 31, 1954. Accumulated deficit on revenue and expenditure account has therefore been raised to £2,259,129. During the year under review there was an all-round reduction of the Corporation's activities. The Corporation's assets and liabilities will be transferred, under the Overseas Resources Development Act, to a new corporation which is to be set up in Tanganyika.

*

Mr. R. H. Mayhew, chairman of **Fillerys Toffees Ltd.,** said at the twentieth annual general meeting on November 16 that the net profits for the period under review, after taxation, amounted to £80,401. After adding the balance of £24,891 brought forward from the previous year, a balance for disposal of £105,292 available for distribution was left. A dividend of 20%, less tax, and a cash bonus of 10%, less tax, were proposed.

*

Caroni Ltd., West India planters, sugar manufacturers, rum distillers, importers, exporters and general merchants, announce in their report for the year ended June 30, 1954, that sugar production amounted to 55,584 tons, an increase of 4,748 tons over the previous year's figure. Total cane ground by the factory amounted to 545,466 tons compared with 516,608 tons in the previous year. The enlarged Brechin Castle factory and the installations for storing and transporting the company's raw sugar for export in bulk have now operated for two crops and have fulfilled all expectations. During the year the company has reaped the benefit of greatly increased economy and efficiency of production, made possible by the centralisation of the firm's affairs. The consolidated net profit of £201,009 is £82,503 more than the previous year.

*

The chairman of **Tiger Oats and National Milling Co. Ltd.,** Mr. R. L. Frankel, in his statement for the year ended June 30, 1954, said that the year marked the tenth anniversary of the formation of the company, although the major manufacturing and trading subsidiaries had a history going back some 30 to 40 years. The turnover of the subsidiaries exceeded £10 million. The net profit of the Group for the year amounted to £623,000, and after deductions for tax, dividends, etc., an unappropriated balance of £359,000 was left at June 30, 1954.

*

Mr. O. P. Horlick, chairman of **Horlicks Ltd.,** in his statement for the year ended March 31, 1954, said that efforts had continued to mechanise still further the company's factory processes. At the Slough factory, higher output than ever before had been achieved. The company's activities in the West Country had progressed satisfactorily, more particularly the West Somerset Bacon Co., which had increased its throughput of pigs and output of bacon and sausages. The net profit before taxation was £477,870 against £431,154. A final dividend of 16⅔%, bringing the total distribution to 30% as in the previous year, was recommended.

*

Premier Industries has sold to the Langeberg Co-operative, subject to confirmation by shareholders, its total share holding in **Associated Canners** of South Africa. A condition of the agreement is that Langeberg Co-operative is to make an offer to the remaining shareholders of Associated Canners to acquire their shares on or before February, 1955, at 10s. per ordinary share, cum dividend, and at 20s. 6d. per preference share, less the dividend paid since July 1 last.

BOOKLETS RECEIVED

★The latest addition to the series of Flavour Folders published periodically by Dodge and Olcott, Inc., is a 72-page brochure describing *Spisoresin* and *Spisorama* seasonings. Details of development, manufacture and application are given, together with flavour strength charts, formulation lists, etc. *Spisoresins* are extracts of natural spices and can be used for the manufacture of dry or liquid seasonings for the food processing industry. *Spisorama* seasonings can be used in the bakery, confectionery, dressings, frozen foods, meats, sauces, soups and animal feed industries.

★The Gas Council has published a new and revised edition of the brochure, "Gas in Industry," which describes and illustrates some of the more important of the 4,000 industrial processes in which gas is used. The amount of gas used by industry has increased by two-thirds since the end of the war, and industrial sales now account for a quarter of the total sales of gas throughout the country.

Food manufacture and baking are among the industries specially featured in this booklet, and some interesting, if brief, facts are given about the use of gas-fired equipment in the making of bread, cereals, confectionery and malt roasting, etc.

*

★The technique of fumigating stacks of stored goods with methyl bromide under gas-proof sheets is described in a new publication issued by the Department of Scientific and Industrial Research—Pest Infestation Research Bulletin No. 1, "Fumigation with Methyl Bromide under Gas-proof Sheets", H.M.S.O., 2s. 6d.

Early experience of the method was confined to the fumigation of small stacks which could be covered by a single sheet but it is now possible to treat very large stacks of materials in buildings or in the open air by using a number of overlapping sheets. Stacks of up to 3,000 tons have been dealt with in this way. Methods have been developed for applying the methyl bromide so that satisfactory distribution of the gas is obtained, and it has been found that losses by leakage can be kept to a minimum if the stack is properly prepared.

New Kent canning factory will employ 2,000

Ashford, Kent, is to be the site of a new £1,250,000 canning factory to be built by Batchelors Peas Ltd. It should give employment to about 2,000 people and will occupy a site of about 25 acres.

"We have to build this additional factory," said Lt.-Col. Maurice W. Batchelor, J.P., chairman of the company, "to meet a steadily rising demand for our products. We hope it will be ready early in June, 1957, and in good time for us to handle the crop of fresh garden peas.

"This will be the most modern factory of its kind in the country and will contain the newest and most up-to-date machinery. Large continuous pressure cookers will handle thousands of cans an hour and electronics will provide "magic eyes" to scrutinise the raw material. We are now experimenting with other new developments.

"We decided on Ashford after looking at sites in other parts of the country. It appeared to be most suited to our requirements. We must be within reach of an area which has peas and other vegetables and fruits growing. A primary requirement too is a huge volume of water—possibly as great as 5 million gal./week."

Batchelors, one of the oldest firms in the canning trade, now employs more than 3,500 people.

Food News Overseas

Chilled beef returns

The first shipment of chilled beef from Australia since 1939 was dispatched recently from the Moreton works, Queensland, of Thomas Borthwick and Sons (Australasia) Ltd. Between 70 and 80 tons of chilled beef were sent direct to Liverpool, and another 100 tons to London. In the first shipment the firm concentrated on ox beef with a range of weight in bodies of 520 to 700 lb.

Further consignments will follow as shipping companies make available vessels fitted for carrying chilled beef.

Australia's olive industry

The verdalion olive, developed in Australia, has proved a profitable producer for a company which, in 1948, took up neglected scrub land at the foot of the Grampians, a Victorian range, and established extensive orchards.

The company opened up 1,320 acres with bulldozers and planted at the rate of 30 trees to the acre. Totalling more than 33,000, the young olive trees have developed very quickly and some have already produced as much as 60 lb. in a season. Mr. J. Friedman, who developed this strain of olive, says that the possibilities for olive-growing in Australia are " tremendous " and what his company had done was only a drop in the ocean.

In the Old World, olives are divided into two classes, one for oil and the other for pickling, but the verdalion olive is an all-round utility fruit and its development is much faster than that of olives in Mediterranean lands. An Italian expert, who visited the five-year-old plantations, said that the trees were comparable with 13-year-old trees in the Mediterranean climate. The rate of development has caused the company to embark on a programme of planting an additional 200 acres each year.

The Australian olive, said Mr. Friedman, compared very favourably with the Californian, which had produced as much as seven tons to the acre. " If we can do that," he added, " there are great possibilities here." The orchards are on light sandy soil which grew only scrub for kangaroos and emus a few years ago, and their establishment was made possible by extensive use of green manures. Tick beans, lupins, field peas and oats are planted in the autumn and are ploughed in.

Commercially the verdalion olive bears at four or five years, and the company's product has so far been pickled. Soon crushing for oil will begin. " Olives are a very profitable business," says Mr. Friedman, " and Australia has suitable country to produce the whole of its requirements and for an export trade."

Sugar from dates

Iraq, the greatest date producer in the world, is frequently faced with the problem of over-production. This aroused the attention of Mr. Mohler, a Swiss professor of chemistry and head of Unesco's Mission for Technical Aid in Iraq.

He found that on the one hand Iraq allowed thousands of tons of dates to go to waste each year, yet was obliged to import 80,000 tons of sugar. Recalling the research work that had been done in Switzerland in regard to sugar derived from fruits, Prof. Mohler, in co-operation with a fruit-growing company, dispatched three tons of dates to Switzerland and, a few weeks later, the Swiss laboratories sent back one ton of liquid date sugar.

This product immediately proved a great success in Baghdad, especially among the confectioners, who, in the East, are as important as are butchers in the West, and now the date industry announces the creation of a first native sugar refinery.

Sixth Australian Canning Convention

The sixth annual Australian Canning Convention, which was held in Adelaide recently, was attended by more than 200 delegates. An outstanding event at this convention, which was opened by the Hon. T. Playford, Premier of South Australia, who is himself a fruitgrower, was an address by Mr. Paul L. Davies, president of the Food Machinery and Chemical Corporation, California, U.S.A.

Among the many papers on technical and economic aspects of canning that were read was one of particular interest to British buyers of Australian canned foods. Mr. A. F. J. Smith, Australian Manager, Co-operative Wholesale Society, gave an informative address on " The British Market and its Requirements from the Buyers' Angle."

The history of the convention goes back to 1946, when a small group, representing canners, fruitgrowers, State Departments and the C.S.I.R.O., met at Leeton, New South Wales, to discuss the merits and disadvantages of a number of new canning peach varieties which were then undergoing trial. A similar conference, with slightly wider representation, was held in 1947, and, in the following year, the Victorian Department of Agriculture held a successful conference at Shepparton. A combined conference was sponsored by the N.S.W. and Victorian Departments of Agriculture and the C.S.I.R.O. Division of Food Preservation in 1949. In that year it was decided to raise the status of the conference to that of a convention.

Since then conventions have been held at Tatura in 1950, Melbourne in 1951, Sydney in 1952 and Melbourne in 1953.

Food control in Eire

More central control of food legislation in Eire was suggested by Mr. C. A. Adams, a former Director of the Standards Division in the Ministry of Food, London, at the inaugural meeting of the Dublin and District section of the Royal Institute of Chemistry. He praised the central advisory service of the Ministry of Food set up in England during the war to assist traders and local authorities and suggested Ireland should study the system in an attempt to put Irish food legislation on a higher plane.

Speaking of food additives, Mr. Adams thought that not only the addition of chemicals to food, but also colouring matter, should be controlled. Centralised legislation would also assist in the control of dishonest food advertising.

Half a million frozen food cabinets

The rapid increase in the output of frozen foods has been one of the outstanding post-war developments in the marketing of farm products in the U.S. In 1953, according to trade reports, 170 million lb. of frozen meats were sold compared with 125 million lb. in 1952, 85 million in 1951, and only 10 million in 1939. The output of frozen prepared foods, such as beef sandwich steaks, frozen waffles and chicken pot pies, amounted to 300 million lb. in 1953.

Frozen foods now make up from 4 to 6% of the total sales of many stores, compared with 2% in the late 1940s. Another trade source estimates that there are now 500,000 frozen food cabinets in 250,000 of the 338,600 retail stores in America. Stores handling frozen foods account for much more than half of the sales of food.

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," September 1, 1954, page 358.

No.	*Date. 1954.*	
		ANIMALS
1280	Oct. 1.	The Slaughter of Animals (Prevention of Cruelty) Regulations, 1954.
857	Dec. 30.	Order amending the Livestock (Sales) Order, 1949, and the Livestock (Sales) (Northern Ireland) Order, 1943. Revokes S.R. and O. 1943, No. 214, 1947, No. 1135, and S.I. 1949, No. 1253.
		BUTTER
1278	Oct. 1.	Order revoking the Butter Order, 1954.
		CANNED FISH
959	Oct. 1.	Order revoking the Imported Canned Fish (Maximum Prices) Order, 1950.
		CANNED FRUIT
1430	Oct. 29.	The Imported Canned Fruit (Revocation) Order, 1954.
		CHEESE
1279	Oct. 1.	Order revoking the Cheese Order, 1954.
		COLD STORAGE
1312	Dec. 25.	The Cold Storage (Control of Undertakings) (Revocation) Order, 1954. Revokes S.I. 1948, No. 1074.
		LICENSING
818	July 4.	Order revoking the Food (Licensing of Establishments) Order, 1948, the Food (Licensing of Establishments) (Amendment) Order, 1948, and the Food (Licensing of Establishments) (Amendment) Order, 1954.
		MINERAL OIL
1044	Aug. 8.	The Mineral Oil in Food (Amendment) Order, 1954. Revokes S.I. 1952, No. 1822.
		MILK
1267	Sept. 30.	Order amending the Milk (Special Designations) (Raw Milk) Regulations, 1949.
1268	,, 30.	Order amending the Milk and Dairies Regulations, 1949. Revokes S.I. 1953, No. 1876.
1193	Oct. 1.	The Milk (Special Designations) (Specified Areas) (No. 2) Order, 1954.
1194	,, 1.	The Milk (Special Designations) (Specified Areas) (Scotland) Order, 1954.
		POTATOES
986	Aug. 1.	The Ware Potatoes Order, 1954. Revokes S.I. 1953, Nos. 1124 and 1734, and 1954, No. 264.
1336	Oct. 25.	The Seed Potatoes Order, 1954. Revokes S.I. 1953, No. 1519, and 1954, No. 360.
		RETAIL PRICES
958	July 22.	Order revoking the Retail Prices (Order), 1944.
		SEIZURE OF FOOD
884	July 4.	Order revoking the Seizure of Food Order, 1948, and the Seizure of Food Order, 1948 (Amendment) Order, 1948.
		SHIPS' STORES
858	July 4.	Order revoking the Ships' Stores Order, 1953, and the Ships' Stores (Amendment) Order, 1954.
889	,, 4.	Order amending the Ships' Stores (Charges) Order, 1952, the Ships' Stores (Charges) (Amendment) Order, 1953, the Ships' Stores (Charges) (Amendment No. 2) Order, 1953, the Ships' Stores (Charges) (Amendment No. 3) Order, 1953, the Ships' Stores (Charges) (Amendment) Order, 1954, and the Ships' Stores (Charges) (Amendment No. 2) Order, 1954.
		STANDARDS
1089	Aug. 22.	Order amending the Food Standards (Soft Drinks) Order, 1953.
		WELFARE FOODS
1401	Oct. 22.	Welfare Foods (Great Britain) Order.
1402	,, 22.	(Northern Ireland) Order.
		WHISKY
1166	Aug. 1.	Order revoking the Scotch Whisky (Auction Sales) Order, 1949.

TEN YEAR INDEX FOR FOOD MANUFACTURE

We understand that some readers would like to have a decennial index to FOOD MANUFACTURE, the first one to cover the post-war volumes from 1945 to 1955. As we would have to be assured of a demand sufficient to justify the cost of preparing such an index, we would like readers to answer these questions:

(1) Do you need a Decennial Index?

(2) How much would you be prepared to pay for it?

Replies should be sent to The Editor, FOOD MANUFACTURE, Stratford House, 9, Eden Street, London, W.1.

Information and Advice

This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Malt Nougat

B.7274. *Could you please supply us with a formula for malt nougat?* (Cornwall)

The following is submitted as a basis for trial:

Tate's Grade 20 pieces	15 lb.
Granulated sugar	15 ,,
Corn syrup	22 ,,
Albumen	8 oz.
Malt extract	3 lb.
Hard butter	1 ,,
Powdered full cream milk ...	1½ ,,
Broken wafer biscuits	1 ,,
Vanillin	1 oz.

The albumen is dissolved in three pints of water and whisked to a froth in the whisking machine. The sugar and corn syrup are cooked to 265°F., and the cooked batch placed in a nougat beater. The beater is set in motion and the albumen added. Just before the completion of process, hard butter (melted), milk powder, malt extract, vanillin, and wafer biscuits are added and allowed to mix thoroughly. The nougat is poured on oiled and dusted cooling slabs to thickness required and, when firm, cut on nougat knives into bars for chocolate dipping.

This nougat will form the basis of an interesting series of variations for chocolate-coated bars by sandwiching the nougat between caramel layers; by the addition of pecans, walnuts, or hazelnuts, or in conjunction with a layer of praline.

Marzipan

B.7275. *Could you send us a recipe for the manufacture of a first grade quality marzipan with 50% almonds and 50% sugar, also incorporating invertase for the purpose of prolonging shelf life?* (London)

The following formula is submitted as a basis for trial:

Ground almonds (including 5% bitter almonds)	50 lb.
Granulated sugar	50 ,,
Invertase	1 oz.

The ground almonds and sugar are placed in a marzipan cooker and cooked until the mass no longer sticks to the hand, when a trial piece is extracted and tested.

The mass is allowed to cool to about 140°F. before adding the invertase. High temperatures destroy the efficacy of invertase. The marzipan is then stored until required for use.

A small amount of liquid colour may be added, egg yellow or orange as desired, according to the purpose for which the marzipan is required.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.7246. *Mincemeat.* (Lancs.)
B.7247. *Extruders for macaroni.* (Lanark)
B.7248. *Brine making equipment.* (Durham)
B.7250. *Rice crispies.* (India)
B.7251. *Albumen and dried wheat gluten.* (Pakistan)
B.7252. *Tomato purée.* (Australia)
B.7254. *Marshmallow.* (N. Ireland)
B.7255. *Cocktail sausages.* (Yorks.)
B.7257. *Marshmallow depositors.* (N. Ireland)
B.7259. *Fondant.* (Scotland)
B.7260. *Bottling and canning carrots and beetroots* (Ireland)
B.7261. *Artificial sausage casings.* (N. Ireland)
B.7264. *Fish meal.* (Ireland)
B.7267. *Waffles and lollipops.* (Gibraltar)
B.7269. *Mincemeat.* (N. Ireland)
B.7270. *Condensed milk.* (Staffs.)
B.7272. *Cornflour, corn starch and maize starch.* (Singapore)
B.7275. *Marzipan.* (London, W.1)
B.7276. *Popcorn.* (Norway)
B.7277. *Factory canteens, strawberry hullers, and mincemeat.* (Kent)
B.7278. *Piping jellies and pickled onions.* (Yorks.)
B.7279. *Seaweed as a food.* (Ireland)
B.7280. *Baking powder.* (British West Indies)
B.7281. *Chewing gum and essences.* (India)
B.7282. *Breakfast cereals.* (Norway)
B.7283. *Liners for wooden cases.* (Yorks.)
B.7284. *Potato crisps.* (Canada)
B.7286. *Extraction of papain from paw paws.* (N. Transvaal)
B.7287. *Food phosphate manufacturers.* (Eire)
B.7288. *Information on pickled onions.* (Partington, Yorks.)
B.7289. *Formula for synthetic cream.* (Smethwick)
B.7290. *Manufacture of meat extracts.* (Eire)
B.7291. *Advice on chocolate refining machinery.* (India)
B.7292. *Adhesive suitable for drinking straws.* (Manchester)
B.7293. *Suppliers of tea-seed oil.* (S. Rhodesia)
B.7294. *Homogenisation of tomato sauce.* (Australia)
B.7295. *Food poisoning from aluminium utensils.* (Eire)
B.7297. *Packages for streaky rashers.* (Eire)
B.7298. *Production of fruit juices.* (Spalding)
B.7299. *Manufacture of chicken products.* (Eire)
B.7300. *Information on dextrose calcium sulphate.* (Winsford)
B.7301. *Supplier of butylated hydroxyanisole.* (Slough)
B.7302. *Machine for grinding cake to flour.* (Stoke-on-Trent)
B.7303. *Details of pre-cooker for peas and beans.* (Knottingley)
B.7304. *Manufacturers of maraschino cherries.* (London)
B.7305. *Bottling of mussels.* (Partington, Yorks.)
B.7306. *Makers of Fryma mill.* (Norway)

Recent Patents

718,026. Rose Bros. (Gainsborough), Ltd.: Apparatus for forming cut blocks from strips of plastic material, *e.g.* ice cream and delivering the cut blocks to a conveyor.
718,084. Rose Bros. (Gainsborough), Ltd.: Forming of cut blocks from strips of plastic material, *e.g.* ice cream and their transference to a forwarding device.
718,604. Schöttle, R. (trading as Schöttle Kommandit.-Ges., R.): Ice cream or like freezing machines.
718,621. Rutter, F. H., and Aldersey, H.: Vacuum apparatus for elevating milk and other liquids.
718,666. Wright, G. D. V.: Fishing device.
718,700. Unga, Ltd.: Production of flour.
719,270. Vanreusel, P. V.: Sausages with double skins.
719,317. Frank, J. J.: Sausage and means and method of producing it.
719,348. Schwaebische Huettenwerke Ges.: Milling machines.
719,385. Dalrymple, J. R.: Baking pans for bread or the like.
719,520. Goddard, Ltd., J. A., and Stephens, Smith and Co., Ltd.: Apparatus for tempering liquid chocolate and for feeding a depositor or like machine.

ABSTRACTS OF BRITISH PATENTS

Process of treating coffee

Broadly considered, the invention relates to the roasting of coffee in the presence of or in contact with a non-toxic porphyrin type compound which has a selective, beneficial action on certain undesirable constituents of the coffee bean to thereby produce a product of enhanced quality.

It has been found that the impregnation of green coffee beans with an additional quantity of chlorophyll amply suffices for a more extensive catalytic oxidation of the contents of the bean without materially affecting the content of the caffeine, so desirable as stimulating factor in coffee beverages. In particular the deleterious trigonelline and chlorogenic acid are markedly reduced in percentage content. Furthermore, the additional oxygenative action serves well to couple butyl, furfuryl and other mercaptans into the polysulphide stage—or that stage definitely contributive to coffee aroma. So marked is this that if sufficient chlorophyll can be evenly distributed within the green bean, the oxidative processes accompanying roasting can be carried out in shorter time and often times at lower temperatures; all of which makes possible a less toxic coffee beverage and yet one with an enhanced aroma. Naturally, too long a roasting with or without chlorophyll will destroy all aroma; hence 5 to 10 minutes roasting is the general practice—717,294. *Verdurin Company.*

Refined sugar syrups from fruit

The cultivation of sugar beet or of sugar cane is in many countries quite insufficient to meet the home demand for sugar. Such countries are therefore compelled to import sugar in large quantities to the detriment of their national economy.

An object of the present invention is to provide a process by which indigenous fruits can be utilised for supplementing the sugar supply, and to provide a method whereby surplus crops of grapes, kernel fruit (apples, pears), stone fruit, bananas, figs, dates, and other fruit rich in sugar can be utilised without fermentation. Furthermore, particular objects of the invention are the utilisation of carob beans as a sugar source, available in very large quantity in Mediterranean countries, and the production of high-grade sugar syrups from fruit waste.

The process is substantially characterised in that in the first instance a limed juice is prepared with a *p*H value between about 9 and 10, and the defecated solution after separation from the formed precipitate passed through a series of four filters one after another. The first filter contains a sulphonated cation exchange resin, the second a weakly basic amine anion exchange resin, the third a strongly basic amine anion exchange resin, and the fourth a cation exchange resin of a type similar to that contained in the first filter. The purified thin juice, adjusted to a *p*H value between about 6 and 7 in the last filter, is subsequently evaporated in a vacuum pan to a sugar syrup of the desired concentration.—716,934. *Unipektin A.G.*

Mechanical moulding of dough pieces

This invention relates to the mechanical moulding of previously prepared dough pieces in breadmaking, and has for its object to improve the appearance, final texture, and crumb of the loaves so produced.

Each dough piece is severed into two parts at the termination of a dough-moulding operation (*i.e.* as the dough piece is being discharged from a conveyor) by means of a cutter whose direction of rotation is such that the "cut" is upward. The severed dough portions then meet an obstruction in their falling path, whereby their cut ends are so retarded that the portions turn through approximately 180° in their continued descent to a surface provided for their reception. The positive turning of the severed portions of the dough pieces is effected in part by the action of the rotating cutter and in part by the obstruction.

With the dough thus positioned, the gases of fermentation are freed to escape through and from the dissociated and outwardly turned portions in the vicinity of the cuts which are exposed to the atmosphere.

In experimental practice, it has been found that a satisfactory obstruction for the severed dough portions in their descent comprises a round bar or tube about one inch in diameter, having a vertical plate attached to and beneath it.—713,617. *Allied Bakeries Limited.*

ABSTRACTS OF FOREIGN PATENTS

Waterproofing of plastic films

The water resistance of emulsion-polymerised plastic coatings is improved by incorporating acid-precipitating agents such as ammonium or amine salts of silicotungstic, phosphotungstic, and tannic acids. These agents offset the hydrophyllic character of emulsifiers and do not alter the storage stability and workability of the plastic dispersions.—Austrian 177,195. *R. Entmayr, F. Lierg, and O. Wolf.*

Food cans coated with plastic films

Tin cans are coated with foils of polyvinyl chloride by inserting a tube of polyvinyl chloride into the metal tube, fixing it by application of heat and pressure, and then joining on the similarly coated lid and base.—German 867,808. *Badische Anilin und Soda Fabrik and H. Beck.*

Meat-curing compositions

Caking of meat-curing compositions containing NaCl and nitrates and nitrites of alkali metals is minimised or prevented by treating the water used in dissolving the salt mixture prior to drying with a cation-exchange material in order to replace Ca and Mg ions with Na ions. Glycerol, sorbitol, or propylene glycol is added to the salt solution in the proportion of 0·3% of the weight of salt.—U.S. 2,668,770. *Lloyd A. Hall.*

Sequestering polyphosphates are employed to render Ca and Mg ions inactive in meat-curing compositions containing NaCl and nitrates and nitrites of alkali metals and having a stabilising *p*H approx. 7·4. A typical mixture contains NaCl 2481, $NaNO_3$ 117, $NaNO_2$ 173, glycerol 9, and Na polyphosphate 4 parts by weight. Any sufficiently soluble sequestering phosphate is suitable. Sorbitol or propylene glycol may be used as the hygroscopic agent in place of glycerol.—U.S. 2,668,771. *Lloyd A. Hall.*

Stable baker's yeast

A baker's yeast which retains its activity through drying or long storage periods is produced by allowing the temperature to rise near the end of the multiplication stage to 36° and by replacing the usual substrates with substrates poor in growth-promoting activity. Thus, alcohol-containing worts, such as those obtained in a preceding yeast production phase, are suitable substrates.—U.S. 2,680,705. *Karl Schneider.*

Trade Marks

ATORA.—709,030. Gravy browning. **Hugon and Co., Ltd.,** High Bank Works, Ogden Lane, Openshaw, Manchester, 11.

BECKY.—718,586. Non-medicated confectionery, biscuits (other than biscuits for animals), and chocolate. **Confiserie "Lonka" Suikerwerkfabriek N/V,** 70, Nieuwstraat, Essen, Antwerpen, Belgium.

APRILIA.—719,341. Cheese. **Latterie Industriali Riunite "Lir,"** Robbio, Pavia, Italy.

TIPTOP.—720,033. Bread for sale in Northern Ireland. **Tiptop Bakeries, Ltd.,** 43-79, Dunraven Avenue, Belfast.

CHEENUTS.—720,861. Biscuits containing nuts. **Eric C. P. Rayner,** 14, Kirkway, Wallasey, Cheshire; Manufacturer.

CHEWTOF.—723,748. Non-medicated confectionery. **Anglo-American Chewing Gum, Ltd.,** Imperial Chambers, George Square, Halifax, Yorks.

ROZZIPOP.—724,205. Lollipops (ice confectionery). **Rossi's Ices (London), Ltd.,** 48, High Street, Walthamstow, Essex.

WINTER SUNSHINE.—724,634. Frozen fruit and frozen vegetables, all being packaged foods. **J. H. Dewhurst, Ltd.,** 14, West Smithfield, London, E.C.1.

SILVER GRAIN.—724,783. Rice, tapioca, and sago. **Kian Gwan (U.K.), Ltd.,** 50, Moorgate, London, E.C.2; Merchants.

CREAMY VALLEY.—725,354. Condensed milk, milk powder, buttermilk powder, whey powder, malted milk, dried vegetables, fish pastes, and meat pastes. **British United Dairies Pty., Ltd.,** 33-35, King Street, Melbourne, Victoria.

TIL-LIES. — 725,664. Non-medicated sugar confectionery. **Batger and Co., Ltd.,** 566, Cable Street, London, E.1.

HAZELY. — 726,234. Tinned fruits, tinned vegetables, bottled fruits, bottled vegetables, fruit preserves, vegetable preserves, and pickles. **Sarnia Canning Co., Ltd.,** Piette Road, St. Peter Port, Guernsey.

CORONA.—726,543. Sweets, being non-medicated sugar confectionery. **Walters' "Palm" Toffee, Ltd.,** "Palm" Works, Westfields Road, London, W.3.

PEDIGREE.—726,914. Emulsions consisting of edible fatty products emulsified in water for use by bakers as bread improvers. **The British Arkady Co., Ltd.,** Skerton Road, Old Trafford, Manchester, 16.

SAMURAI.—727,302. Canned, dried, and preserved foodstuffs. **Tokyo Shokuhin Kabushiki Kaisha (Tokyo Food Products Co., Ltd.),** 7th Floor, Mitsui Annex Building, 3, 3-Chome, Muromachi, Nihonbashi, Chuo-Ku, Tokyo, Japan.

MAGPIE BRAND.—727,522. Custard powder, Christmas puddings, and coffee and chicory essence. **Chivers and Sons, Ltd.,** The Orchard Factory, Cambridge Road, Histon, Cambridge.

MEATAST.—727,741. Seasoning for meat products. **T. Lucas and Co., Ltd.,** "Ruskit" Mills, Moravian Road, Kingswood, Bristol.

ORCHARD GOLD.—727,968. Meat; fish, poultry, and game (other than live fish, live poultry, and live game); meat extracts, canned fruits, and canned vegetables; jellies (for food) and hams; jams, eggs, milk and dairy products (for food); edible oils and edible fats; and pickles. **Amalgamated Fruit Packers (Smarden), Ltd.,** Marley Farm, Smarden, Kent.

FORTHCOMING EVENTS

Chemical Society

January 13. "Some Experience of Food Legislation During the War," by Sir Harry Jephcott, 7 p.m., Department of Chemistry, The University, Bristol. Joint meeting with the R.I.C. and the S.C.I.

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Institute of Refrigeration

January 27. "Economic Aspects of Cold Store Design and Operation," by G. A. May, 5.30 p.m., Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, London, S.W.1.

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Society of Chemical Industry

January 7. "New Ideas on the Biosynthesis of Milk Fat," by S. J. Folley, 7.15 p.m., The Royal Technical College, Glasgow.

Food Group

January 12. "The Chemical, Physical and Structural Characteristics of Egg Shells," by F. C. Tyler, 6.30 p.m., Rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1.

January 26. "The Rôle of Soya in the Field of Nutrition," by E. M. Learmonth and W. F. J. Cuthbertson, 6.30 p.m., Rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1.

Microbiology Group

January 12. "Aeration in Industrial Fermentations": (*a*) "Factors affecting the Rate of Solution of Oxygen in Water," by A. L. Downing and G. A. Truesdale; (*b*) "The Mechanics of Bubble Formation," by R. H. Bowers; (*c*) "Surface Active Effects within Gas Bubbles," by F. H. Garner and P. E. Sawyer; (*d*) "The Effects of Aeration on Fungal Metabolisms," by G. N. Rolinson, 2.15 p.m., Institute of Civil Engineers, Great George Street, London, S.W.1. Joint meeting with the Society for Applied Bacteriology.

Agriculture Group

January 17. The Crop Protection Products Approval Scheme, 2: "The Analysis of Insecticides: Tar and Petroleum Oil Washes," by J. T. Martin and G. V. Coles; "The Analysis of Weedkillers: M.C.P.A. and Diroseb," by K. Gardner, 5.30 p.m., Rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1.

Chemical Engineering Group

January 11. Refrigeration: "Introduction," by E. Griffiths; "Volatiles," by J. C. Fidler; "Some Thermodynamic Properties of Fish and their Effect on Rate of Freezing," by R. A. K. Long, 5.30 p.m., Rooms of the Geological Society, Burlington House, Piccadilly, London, W.1.

New Companies

L. and A. Fischoff, Limited. (536783. Hampton Place, off Erskine Street, Hulme, Manchester, 15. To carry on business of egg merchants, processors, and distributors, chocolate and other confectionery merchants, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: L. Fischoff, 2, Ruskin Road, Stretford, Manchester, 16; A. Fischoff, 411, Wilmslow Road, Withington, Manchester, 20.

Sweetmeats, Limited. (536784.) 125, Windsor Walk, Luton. To carry on business of confectionery manufacturers and dealers, etc. Nom. cap.: £500 in £1 shares. Dirs.: W. J. N. Mason and N. V. Mason.

Albert E. Jones (Cardiff), Limited. (536902.) 10, New Road, Rumney, Cardiff. To carry on business of importers and merchants of cooked meats and other meats, butchers, etc. Nom. cap.: £4,000 in £1 shares. Dirs.: A. E. Jones, Mrs. I. F. Jones, B. R. Jones, and D. A. Jones, all of 10, New Road, Rumney, Cardiff.

Andrews Delicacies, Limited. (536903.) Schofield Street, Royton, Lancs. To carry on business of manufacturers, preparers, and distributors of foodstuffs, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: W. A. Szyjkowski, 36, Longford Place, Victoria Park, Manchester, 14; J. Frankland, Ash House, Wardle, nr. Rochdale; J. J. Gomola, 32, Lesney Park Road, Erith, Kent.

Samworth and Seymour (Bacon), Limited. (536950.) 18, West Street, Bourne. To carry on business of bacon curers, pork butchers, etc. Nom. cap.: £5,000 in £1 shares (4,500 cum. pref.). Dirs.: F. Samworth and Phyllis M. G. Samworth, Enderby, Croft Road, Edwalton, Notts.; K. A. Seymour and G. W. Seymour.

Davies and Son (Lletty), Limited. (536964). The Butter Factory, Llanglydwen, Hebron, Whitland, Carms. To carry on business of blenders, packers, and distributors of butter, packers, collectors, graders, and distributors of eggs, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: D. H. Davies, Erwlas, Narberth, Pembs.; D. T. Davies, Caerhaul, Llandissilio, Clynderwen, Pembrokeshire.

Elizabeth Shaw (Holdings), Limited. (536965.) To acquire and hold shares, stocks, debentures, etc. Power is taken to carry on business of manufacturers of and dealers in cocoa, chocolate, sweetmeats, toffee, ice cream, jams, cakes, etc. Nom. cap.: £100 in £1 shares. Dirs.: not named. Subs.: E. A. Clarke, 73, Durning Road, Upper Norwood, S.E.19 (clk.); M. Q. Walters, 20, Redcliffe Road, S.W.10 (clk.).

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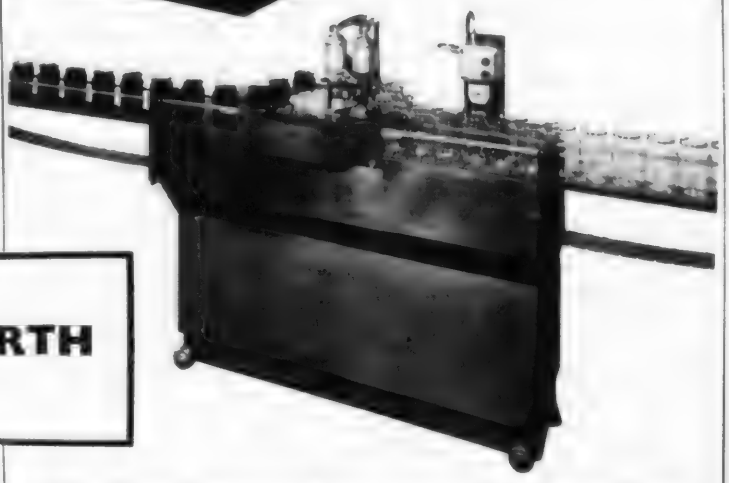

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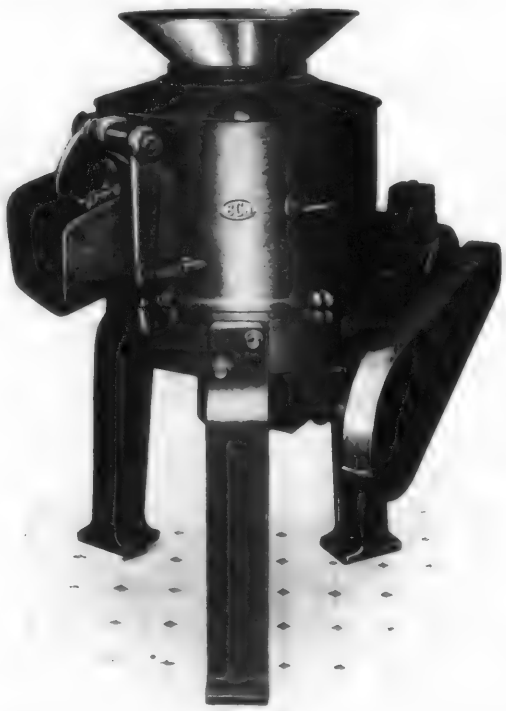

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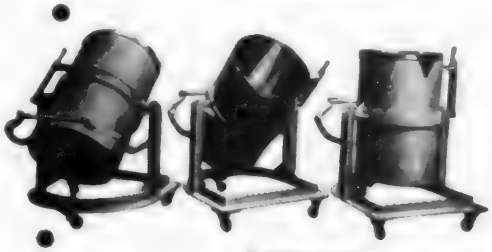

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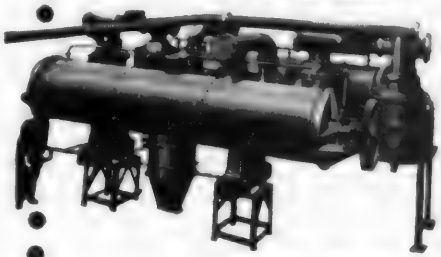

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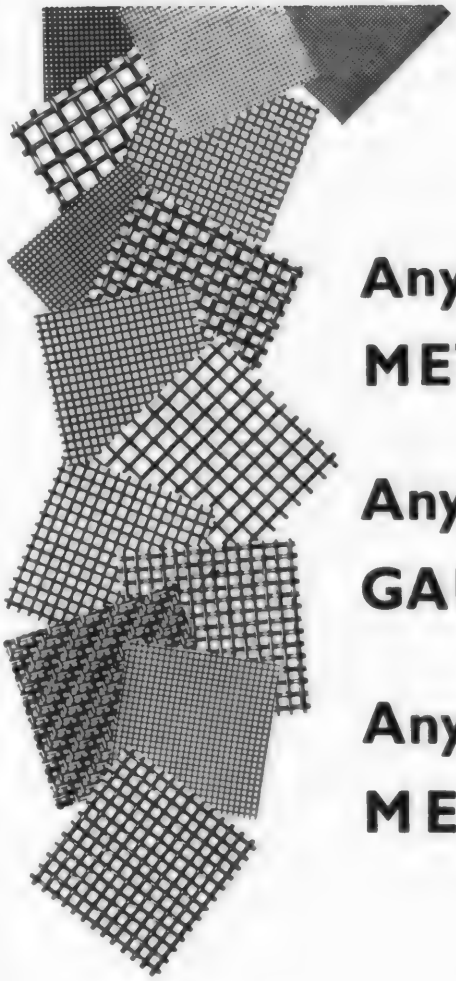

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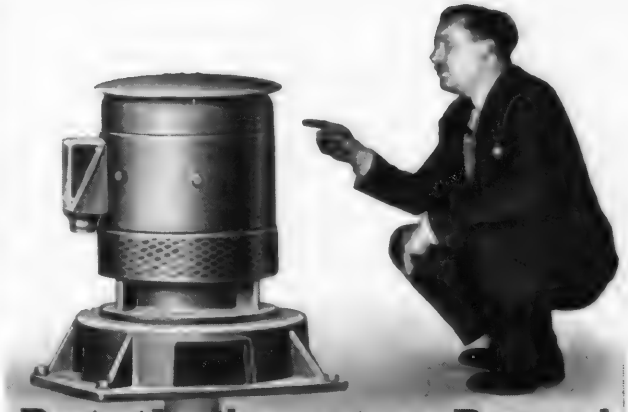

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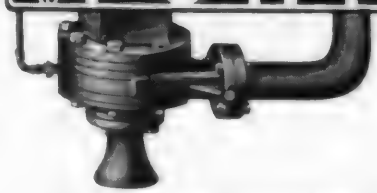

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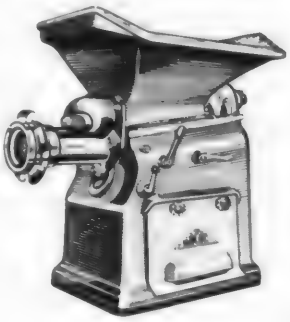

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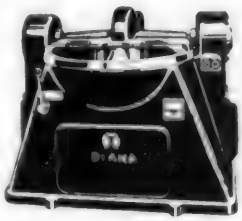

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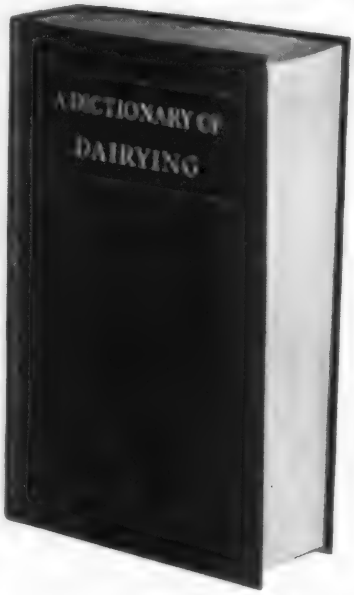

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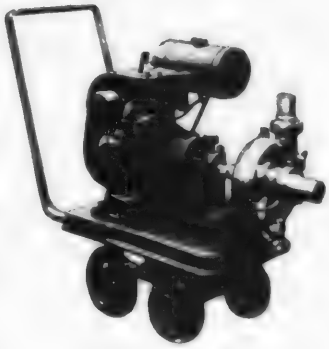

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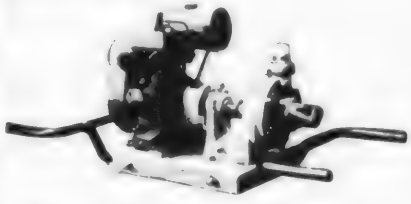

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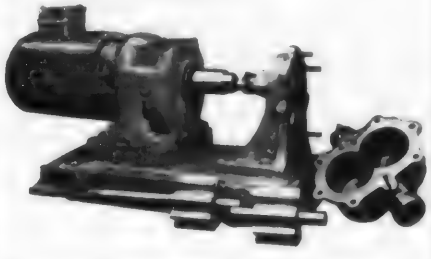

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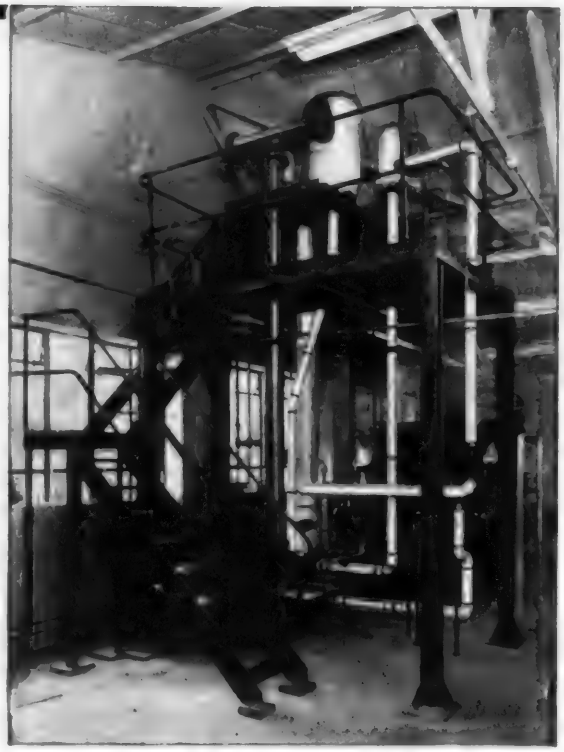

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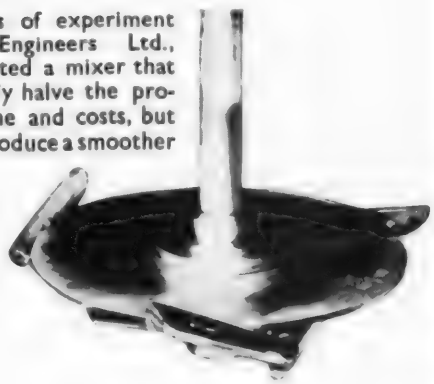

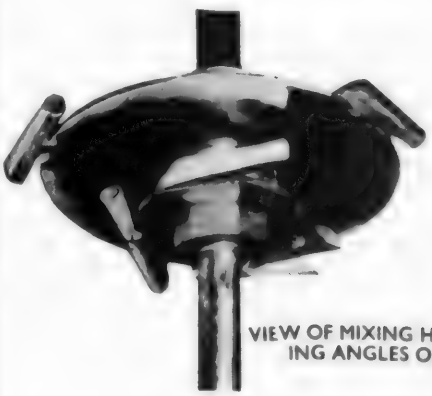

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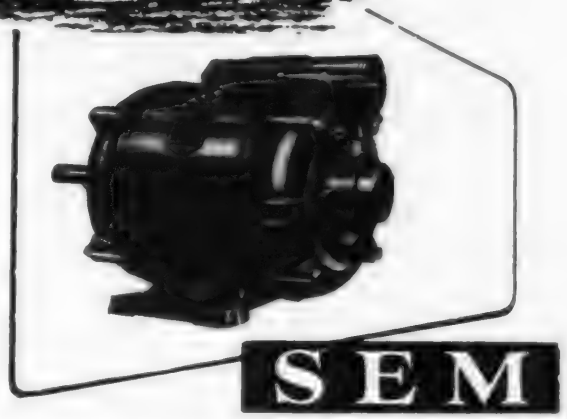

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The diagram on the left illustrates the basic working of the SORTEX Model Type G.2. Each machine is a compact and entirely self-contained unit, normally arranged for 220/240 v. single phase, 50 cycles A.C. Other voltages by arrangement. Machines now in operation are doing 24 hours service.

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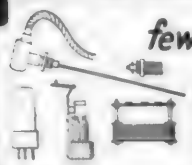
few components



A dipstick and co-axial cable, together with the compactly housed transformer, valve, relay and condenser are the only components. No flaps, floats or moving parts!

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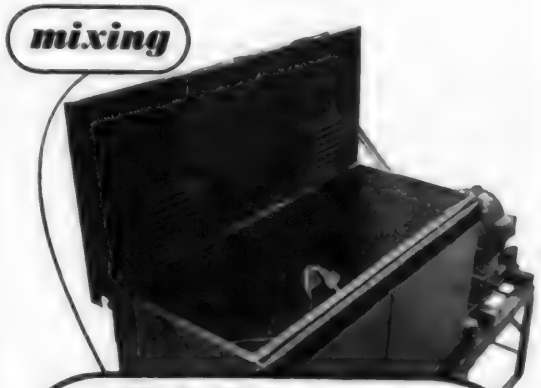
mixing



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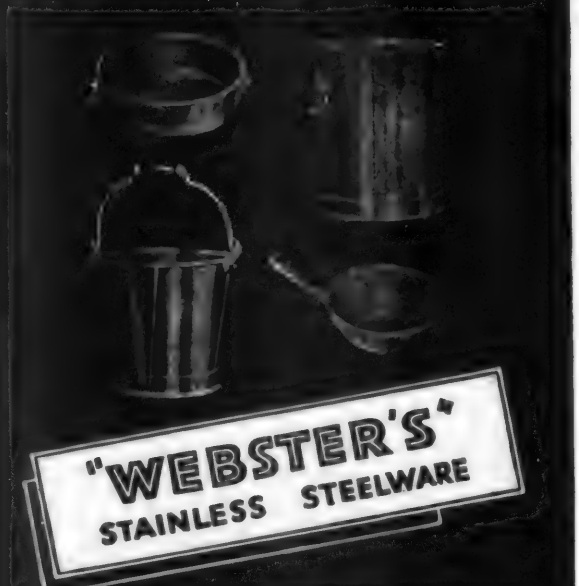

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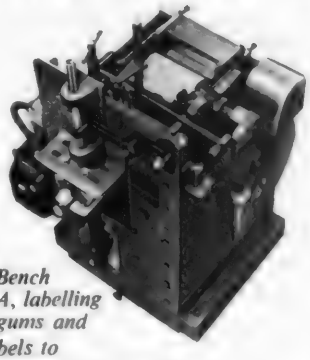
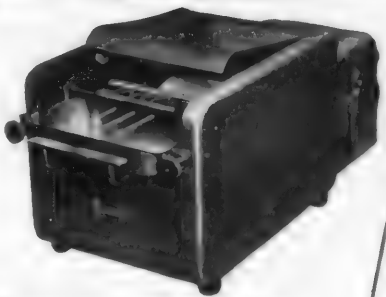


Portable Bench Model 23A, labelling machine, gums and applies labels to small and medium sized packs.



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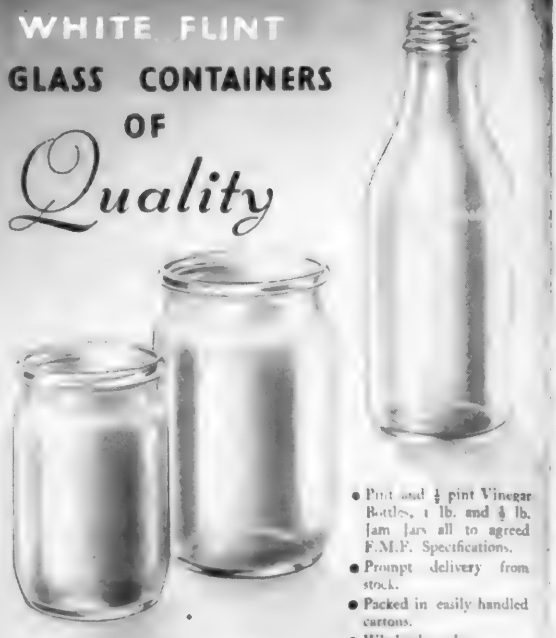

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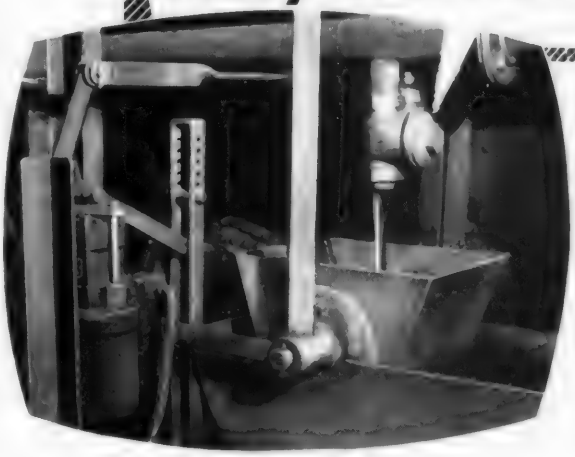

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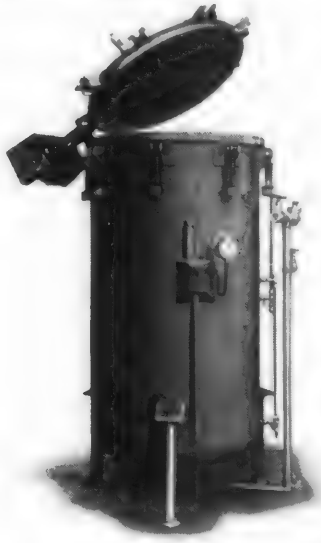

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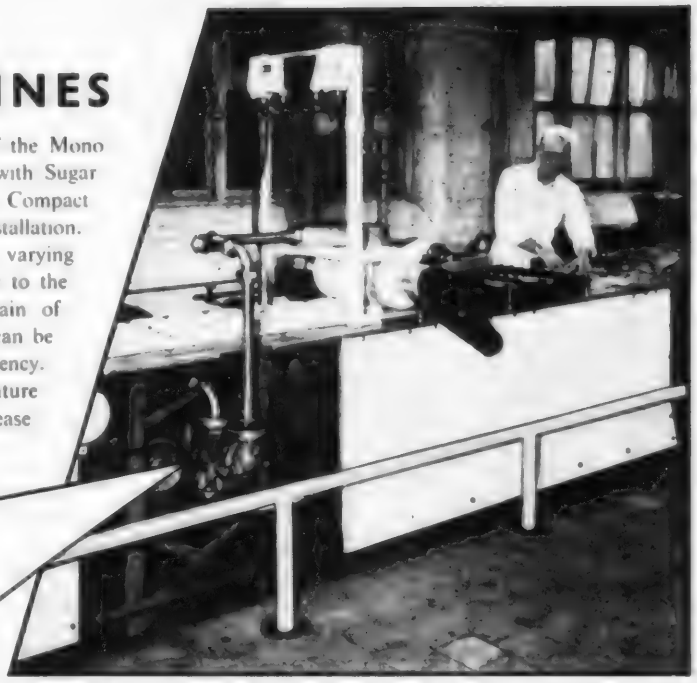

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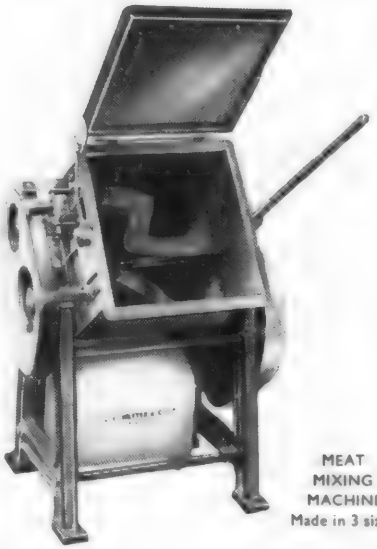

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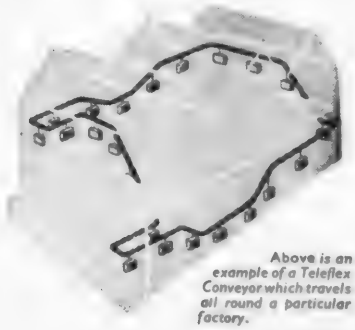

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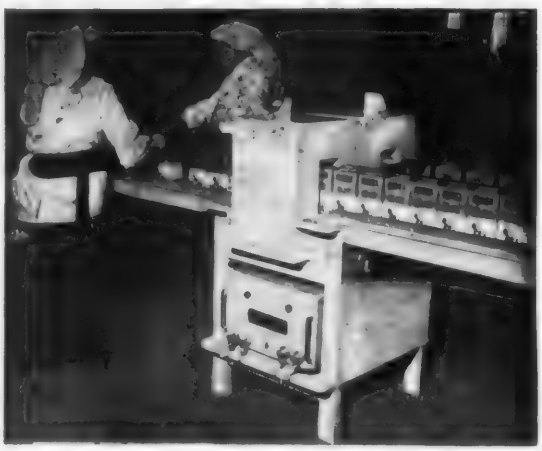

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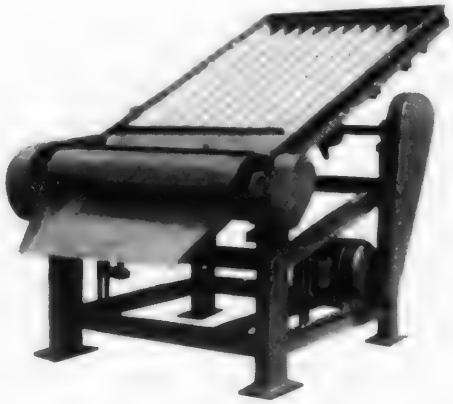

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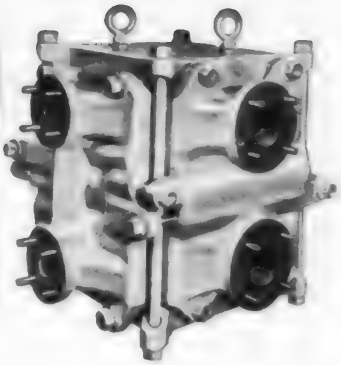

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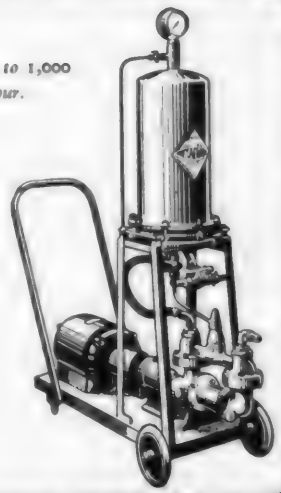

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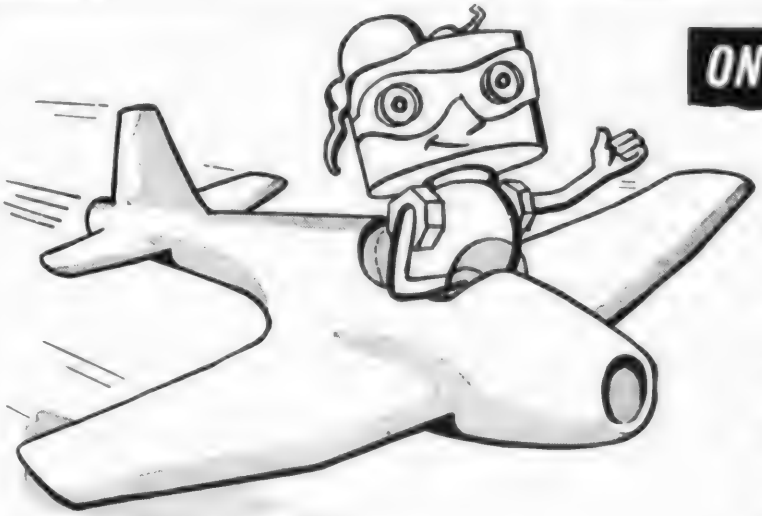

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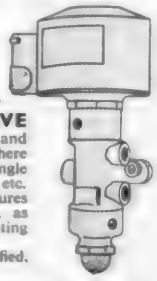

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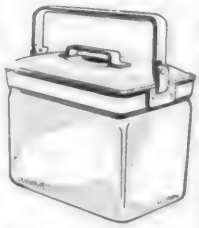

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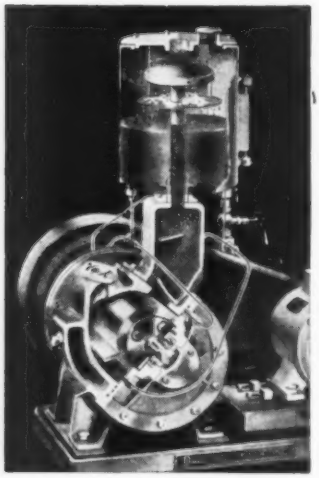

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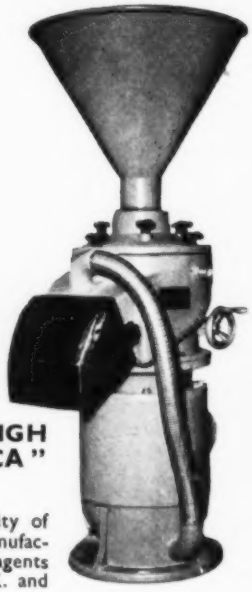

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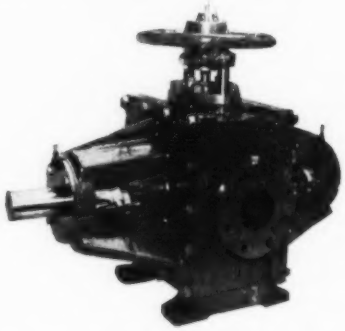

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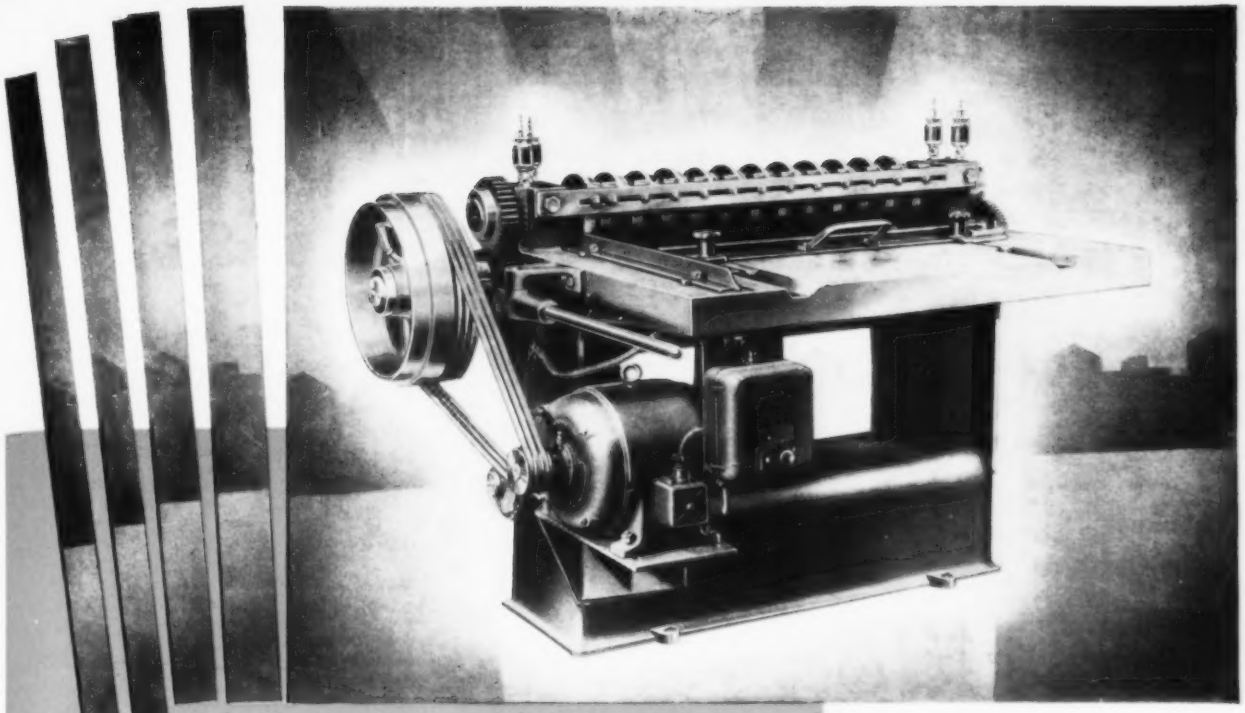

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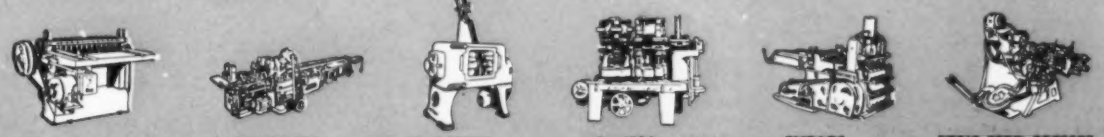

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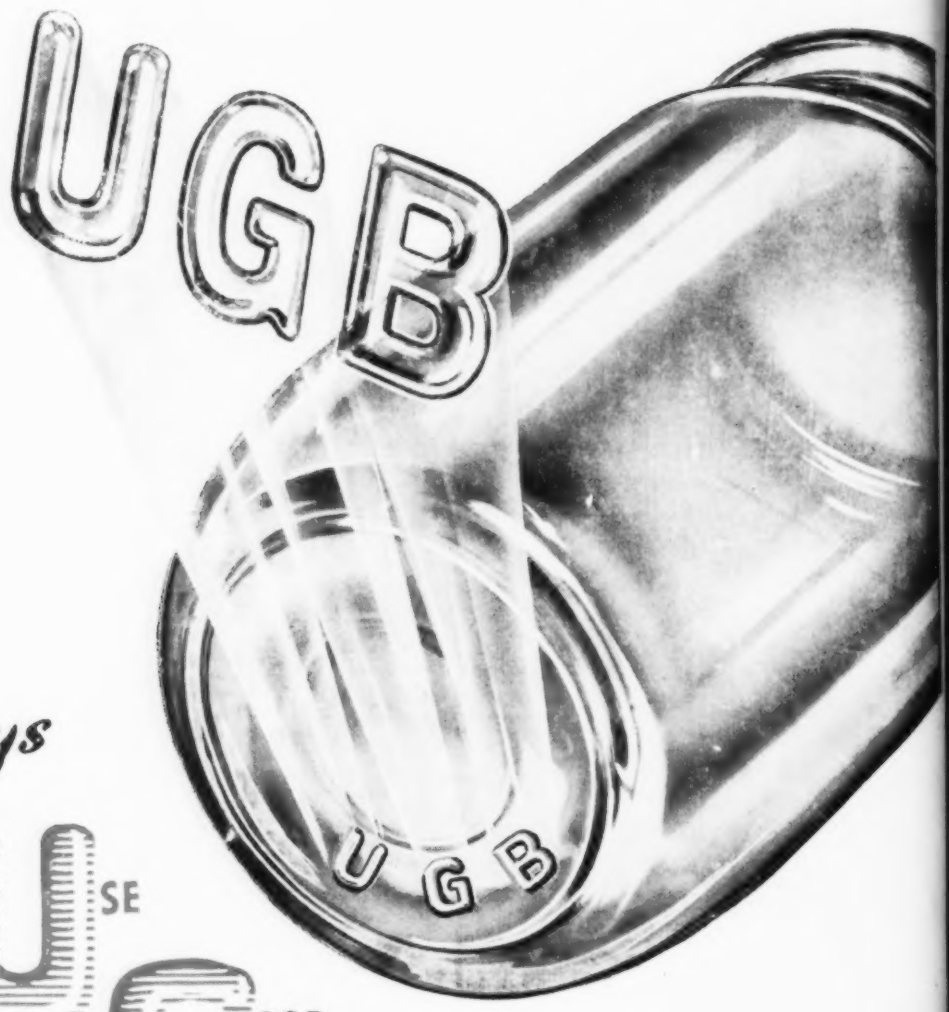

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